ERRATA

The following typographical errors, etc., which escaped the proof-reader, have been noted, and corrections should be made in the text:

Page 2, line 5 from bottom: for *'australiae'*, read *'americanum'*.
" 4, line 3: for 'Aculate', read 'Aculeate'.
" 4, line 7: for *'sandwichensis'*, read *'sandwichiana'*.
" 19, line 29: after 'seeds', insert 'of *Adenanthera pavonina*'.
" 25, line 29: for 'Though', read 'No'.
" 34, line 1: omit 'group of'.
" 35, line 19: for *'Mystroconemis'*, read *'Mystrocnemis'*.
" 42, lines 10, 11: for 'Hydrophillid', read 'Hydrophilid'.
" 55, line 29: place a period between *'Epyris'* and 'Bridwell'.
" 59, line 30: for 'on', read 'an'.
" 72, line 14: for 'through', read 'three'.
" 72, lines 29 & 30: belong to the paper ending on page 71.
" 86, line 36: for 'transmission', read 'transition'.
" 77, line 23: for 'general', read 'genera'.
" 89, line 2: for 'acuate', read 'arcuate'.
" 96, line 22: for 'throax', read 'thorax'.
" 99, line 24: for *'Lipoechaeta'* read *'Lipochaeta'*.
" 99: omit paragraph lines 28 to 32.
" 99, line 4 from bottom: insert 'on *Raillardia menziesii*', before 'which'.
" 100, line 16: for 'later', read 'lateral'.
" 100, line 37: for 'specimen', read 'specimens'.
" 103, line 33: for 'recahing', read 'reaching'.
" 108, line 5: place a period after *'I'*.
" 165, line 11: remove parentheses.
" 165, line 12: for 'Amr.', read 'Ann.'.
" 178, line 15: for 'is', read 'in'.
" 180, line 15: for 'continued', read 'contained'.
" 180, line 21: for 'Samoan', read 'Samoa'.
" 181, line 16: for *'oblusata'*, read *'obtusata'*.
" 195, line 7: for 'parsite', read 'parasite'.
" 195, line 24: for *'peregina'*, read *'peregrina'*.
" 198, line 19: for 'scorbes', read 'scrobes'.
" 199, line 23: for 'scorbes', read 'scrobes'.
" 202, line 4: for 'elonagte', read 'elongate'.
" 212, line 37: for 'on', read 'one'.
" 214, line 4: for 'that', read 'than'.
" 216, line 24: for 'closely', read 'close'.
" 218, line 25: for 'moderatel', read 'moderately'.
" 221, line 3 from bottom: for 'hast', read 'host'.
" 225, line 3: insert 'of' after 'larvae'.
" 227, line 20: for '88', read '.88'.
" 228, line at bottom belongs at top.

PROCEEDINGS

OF THE

Hawaiian Entomological Society

Vol. IV, No. 1. FOR THE YEAR 1918. JUNE, 1919.

JANUARY 3RD, 1918.

The one hundred forty-eighth meeting of the Society was held in the usual place, President Pemberton in the chair. Other members present: Messrs Bridwell, Crawford, Ehrhorn, Fullaway, Mant, Swezey, Timberlake and Willard.

Minutes of previous meeting read and approved, with corrections.

ENTOMOLOGICAL PROGRAM.

Lepidoptera from India.—Mr. Mant exhibited a collection of Lepidoptera from Sikkim, India, including one specimen from Aru.

Vanessa tammeamea.—Mr. Swezey reported seeing a Kamehameha butterfly in his garden at Kaimuki. The insect seldom comes down from the mountain forests where its native food-plant (*Pipturus*) grows.

Pantala flavescens.—Mr. Pemberton reported finding a specimen of this dragonfly 15 miles from land in the channel between Oahu and Molokai.

Phora sp.—Mr. Pemberton exhibited a series of a Phorid fly bred from decaying pineapples.

Sierola from Fiji.—Mr. Bridwell reported finding a species

of *Sierola* among material collected in Fiji by Mr. Muir. There are no previous records of the genus in Fiji.

Epyris extraneus in the Philippines.—Mr. Bridwell reported finding this Bethylid in material collected by Mr. Muir in the Philippines. The species was recently described by him from examples collected in Honolulu.

Margaronia exaula.—Mr. Fullaway reported breeding this moth from *Ochrosia* at the Government Nursery.

Lindorus lophanthae.—Mr. Fullaway gave notes on the egg-laying habits of this lady-beetle, which oviposits beneath the scale of *Phenacaspis eugeniae.*

Maui Insect Notes.

BY O. H. SWEZEY.

Dec. 18 to 21, 1917, were spent on Maui sugar plantations investigating leafhopper conditions. At the same time the following insects exhibited were noted and collected, being the first record of their capture on the Island, except in case of the last three.

Epyris extraneus. Two specimens of this recent immigrant were taken, each was on a cane leaf, one at Puunene and the other at Wailuku.

Opisthacantha dubiosa. One specimen taken on a cane leaf at Lahaina.

Pseudogonatopus hospes. Leafhoppers parasitized by this Dryinid were observed in canefields at Puunene, Wailuku and Lahaina. Some cocoons were also found on the leaves.

Helegonatopus pseudophanes. Reared from *Pseudogonatopus hospes* cocoons at Puunene.

Saronotum australiae. Reared from cane leaves collected at Olowalu. Undoubtedly from a Dryinid cocoon on one of the leaves.

Bruchus pruininus. Seven specimens taken on flowers of *Lucaena glauca* at Kihei, Wailuku and Lahaina.

Heterospilus prosopidis. One specimen taken on a cane leaf at Wailuku. It is the introduced parasite on the above Bruchid.

Diachus auratus. Six specimens taken on flowers of *Lucaena glauca* at Lahaina.

Calandra linearis var. *striatus.* Several dead specimens in old tamarind pods at Lahaina.

Schistoceros cornutus and *Sinoxylon conigerum.* Both these beetles found in the branches of a dying Hibiscus in a hedge at Wailuku.

Catorama mexicana. One specimen in tamarind pod at Lahaina.

FEBRUARY 7TH, 1918.

The one hundred forty-ninth meeting of the Society was held in the usual place, President Pemberton in the chair. Other members present: Messrs. Bridwell, Crawford, Fullaway, Giffard, Mant, Swezey, Timberlake, Wilder, and Williams.

Minutes of previous meeting read and approved.

NOTES AND EXHIBITIONS.

Bruchus pruininus.—Mr. Bridwell gave some notes on the habits of this beetle in Honolulu. Mr. Swezey reported having colected it last year at Chico, California, where it breeds in the seeds of the black locust.

Halobates sp.—Mr. Pemberton reported again finding this marine bug numerous along the beach at Waikiki during a heavy "kona" storm. They appear, according to his observation, only when the wind blows steadily from the south for two or three days.

Samoan Insects.—Mr. Giffard exhibited a small lot of insects from American Samoa, collected by Dr. H. C. Kellers,

U. S. N., and transmitted by Governor Poyer. It included moths, butterflies, phasmids, dragonflies, and roaches; also a few Aculate Hymenoptera collected by Professor R. W. Doane at Apia, British (formerly German) Samoa.

Plutella maculipennis.—Mr. Swezey exhibited a series of this moth bred from the pods of *Capparis sandwichiana*, collected on a rocky ledge a little east of Diamond Head. The series presented variations.

Ceratitis capitata.—Mr. Swezey reported breeding seven adult Mediterranean fruitflies from a fruit of *Capparis sandwichiana,* from the same locality as above. It is the first record of this being a host plant for this fly.

Chelonus blackburni.—Mr. Swezey reported on some observations made by him on the habits of this Braconid which indicate that it has similar habits to *C. texanus,* the biology of which was published by Pierce and Holloway in the Journal of Economic Entomology, V, p. 425, 1912. He observed the adults of *Chelonus* flying about an *Amarantus* plant on which *Hymenia recurvalis* was breeding, and saw them apparently ovipositing in the *Hymenia* eggs. Of 11 eggs collected from the plant, only one went thru to maturity and produced a moth. Seven were destroyed by an egg-parasite (*Pentarthron flavum*), and two hatched caterpillars which nearly reached their full growth, spun cocoons, then were devoured by the Braconid larva which had developed inside each of them. On account of being disturbed, the larvae failed to make cocoons and did not mature, tho they developed far enough to be recognized as *Chelonus,* and thus demonstrates the similarity of its life-history to that of *C. texanus* and perhaps other species of *Chelonus.*

Nests of Philippine Wasps.—Mr. Williams exhibited the peculiar nests of certain solitary wasps found in the Philippine Islands, and gave notes on the habits of the builders.

Calligaster sp.—A large nest of several cells covered with leaves. The egg is placed in the middle of the side of the cell, not suspended. The larva is active and is fed from day to day.

Ischnogaster sp.—Forms a link between Vespids and Eumenids. Young fed with nectar. Hair fungus attached to nest.

Ischnogaster sp.—Nest made of decayed wood and very fragile.

Ischnogaster sp.—Pedicel of nest with ant-guard.

A species of *Vespa* goes around breaking down these nests.

Serangium maculiferum and *Cyrema nigellum*. Mr. Fullaway stated that the small black Coccinellid occasionally taken here is known under these two names but there appears to be but one species, for which the first name should be used.

Fruitfly control.—In a discussion of the present state of fruitfly control, Mr. Giffard reported that in Honolulu a great deal more sound fruit is being obtained at present than for some years past, and that he was positive that musk melon crops were ruined by the melonfly as early as 1881, although the fly was not reported here until 1897.

MARCH 7TH, 1918.

The one hundred fiftieth meeting of the Society was held in the usual place, President Pemberton in the chair. Other members present: Messrs. Crawford, Ehrhorn, Fullaway, Giffard, Kuhns, Swezey and Timberlake.

Minutes of previous meeting read and approved with corrections.

Chalcolepidius erythroloma.—Mr. Swezey exhibited an apparently nearly full-grown larva of this large Elaterid beetle which he had found in a dead, partially rotten tree trunk of *Maba sandwicensis* on Niu Ridge, February 10th, 1918. There were termites and lepidopterous larvae in the same tree. Some of the termites were placed in a tin box with the beetle larva and after a day or two were found to have all been eaten. Since then, it has been fed with the larvae of *Adoretus,* eating two or three daily. Thus the predacious habit of this Elaterid is proven.

Capua n. sp.—Mr. Swezey exhibited 6 specimens of a Tortricid moth reared from larvae found on the leaves of *Reynoldsia sandwicensis* in Niu Valley, February 10th, 1918, which is an undescribed species not previously collected.

Thecla echion.—A specimen of this butterfly was exhibited by Mr. Swezey, bred on egg-plant. The larvae were found on the leaves and in the fruit, February 5th. Three butterflies were reared from the material gathered. The species is one of the two species of butterflies introduced from Mexico to feed on Lantana. In 1908, Kotinsky reported having bred one of these butterflies from pepper pods (Proc. Haw. Ent. Soc. II, p. 36, 1909). It may possibly have been this species.

Nesosydne leahi.—Mr. Giffard reported that he and Mr. Fullaway in collecting on Diamond Head slopes, February 24th, 1918, had discovered the macropterous form of this Delphacid.

California Hemiptera.—Mr. Giffard exhibited a collection of Central Californian Homoptera and Heteroptera made by him during the summers of 1916 and 1917, and determined and catalogued by Mr. E. P. Van Duzee in the Proceedings of the California Academy of Sciences, 4th series, Vol. II, No. 11, pp. 249-318, Dec. 31, 1917. The collection enumerates 355 species in all, including a few forms taken by Mr. Gif-

fard in the Sierras, Oregon and Washington. Included in the above, Mr. Van Duzee has described 47 new species. The collection exhibited includes series of a large majority of the species enumerated together with allotypes and paratypes of the new species. All holotypes are in the collections of the California Academy of Sciences.

Ithamar n. sp.—Mr. Swezey exhibited a specimen of bug collected on Niu Ridge, February 10th, 1918, which is undoubtedly a new species of this genus, or a closely related one.*

APRIL 4TH, 1918.

The one hundred fifty-first meeting of the Society was held in the usual place, President Pemberton in the chair. Other members present: Messrs. Crawford, Ehrhorn, Fullaway, Giffard, Kuhns, Osborn, Pemberton, Swezey, Timberlake and Willard. Mr. Van der Goot of Buitenzorg, Java, was a visitor.

Minutes of previous meeting read and approved.

Mr. Joseph Rosa was elected to active membership.

NOTES AND EXHIBITIONS.

Coniocampsa vesiculigera.—Mr. Swezey exhibited five specimens of this Coniopterigid collected by him March 17th at Ewa by sweeping on *Euphorbia* bushes. He stated that he had collected a few specimens at his place in Kaimuki in 1914, which was the first record of its capture in Hawaii.

Pipunculus sp.—Mr. Timberlake exhibited a Pipunculus fly captured March 25th on the window at the Sugar Planters' Experiment Station. It is thought to be the first record of the capture of a Pipunculus in the city of Honolulu, they customarily remaining in their natural habitat in the mountain forests.

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* The same species was taken by Mr. Bridwell at the Nuuanu Pali on *Euphorbia*, June, 1917, and later on *Euphorbia* in Iao Valley, Maui, 1918, by Swezey and Bridwell.

Cerotrioza bivittata.—Mr. Swezey exhibited a specimen of this Psyllid collected by him on Mt. Tantalus, March 29th. This insect has been collected but a few times, first at Opaeula, next at Niu, and now on Tantalus. In each case but a specimen or two were taken, and always on *Xylosma Hawaiiense.*

Hevaheva sp.—Mr. Swezey exhibited specimens of a Psyllid bred from nymphs on *Pelea* leaves from Mt. Tantalus. The nymphs resembled Aleyrodids, and were not in galls the same as other species of *Hevaheva* occurring on *Pelea.* Instead they were situated in slight depressions on the surface of the leaf.

Notes on Java Insects.—Mr. Van der Goot spoke some on insect collecting in Java. He exhibited specimens of a queer Coccid which climbs on the backs of ants and is thus transported by them. He referred to the chief agricultural insect pests in Java: scale insects, caterpillars, and white grubs He stated that the leafhoppers were not injurious to sugar cane, the most important cane pest being the moth borer.

MAY 2ND, 1918.

The one hundred fifty-second meeting of the Society was held in the usual place, Vice-President Timberlake in the chair. Other members present: Messrs. Crawford, Ehrhorn, Fullaway, Giffard, Kuhns, Rosa and Swezey.

Minutes of previous meeting read and approved.

On account of the Treasurer reporting lack of funds sufficient to pay the printing bill for the 1917 Proceedings, Mr. Giffard was appointed a committee to seek financial assistance from the Hawaiian Sugar Planters' Association. It was voted that a bound copy of Vol. III of the Proceedings be procured and presented to the Trustees of the Association.

PAPER.

Insects Occurring on Plants of Lobelioideae in the Hawaiian Islands.

BY O. H. SWEZEY.

The species of this family are not much attacked by insects. Those which do attack them are not particularly injurious to the plants. The fact that so few insects attack the Lobelioideae accounts for there having been less special attention given to collecting insects from these plants than to many others which yield insects in greater numbers.

Some of the insects mentioned below may be specially attached to their respective plants, not having been reared from others; but the records are altogether too meager to state with certainty until more observations are made. The following list is made up from the records of several entomologists: Dr. Perkins, Messrs. Giffard, Swezey, Timberlake and Bridwell.

These records are almost entirely from collecting on the Island of Oahu. If special collecting should be done on the Lobelioideae on the other islands no doubt many more species could be added to the list.

HYMENOPTERA.

Family Braconidae.

Microdus hawaiicola. Bred from *Thyrocopa* sp. in dead stem of *Clermontia.*

A Figitid has been collected on *Rollandia.* It was probably parasitic on a Drosophilid.

LEPIDOPTERA.

Family Gelechiidae.

Thyrocopa sp. This moth has been reared from larvae in dead stems of *Clermontia.*

Family *Carposinidae.*

Heterocrossa olivaceonitens. This moth has often been reared from larvae in the fruit and flower buds of *Clermontia kakeana.* It has been reared also from various other kinds of fruits.

Heterocrossa gemmata. This moth has been reared from the flowers and fruit of *Rollandia,* and from the fruit of *Clermontia.*

Heterocrossa crinifera. This species occurs as a leaf-miner in *Rollandia Humboldtiana.*

Heterocrossa sp. An undetermined species reared on one occasion from larva boring in stem of *Cyanea.*

Family Hyponomeutidae.

Neelysia sp. Reared from larvae in dead stems of *Clermontia.*

Hyperdasys cryptogamiellus. This moth was reared from a larva in the dead stem of *Clermontia.* It has been found in dead wood of other kinds as well.

Family Tineidae.

Opogona aurisquamosa and *O. apicalis.* Reared from larvae in dead *Clermontia* stems.

DIPTERA.

Family Agromyzidae.

Agromyza sp. On a few occasions the leaves of *Clermontia persicifolia* have been found mined with the larvae of a fly, but none reared to maturity.

Larvae of some fly have been found in young shoots of *Clermontia parviflora* on Hawaii. Perhaps some Drosophilid or other scavenger.

HEMIPTERA.

Family Delphacidae.

Nesosydne blackburni. This leafhopper has been taken on *Clermontia parviflora,* on Hawaii, but it usually occurs on other plants.

Nesosydne pseudorubescens. This species has also been taken on *Clermontia parviflora,* tho it usually occurs on koa.

Nesosydne lobeliae and *N. montis-tantalus* occur on *Lobelia hypoleuca.*

Nesosydne timberlakei has been taken on *Cyanea truncata.*

Nesosydne wailupensis has been collected on *Rollandia crispa.*

Nesodryas giffardi has been collected in abundance on *Rollandia crispa.*

Family Tettigoniidae.

Nesophrosyne spp. Several species of these leafhcppers have been collected from different Lobelioideae, but they are as yet undetermined.

Family Miridae.

Several species of plant bugs have been collected from Lobelioideae, but they are as yet undetermined.

Family Anthocoridae.

A bug of this family has been taken in hollow dead stems, where in search of prey.

Family Coccidae.

Saissetia hemispherica. Has been found on *Clermontia parviflora* on Hawaii.

COLEOPTERA.

Family Carabidae.

A few of this family are sometimes found hiding or in search of prey in the hollow dead stems of *Clermontia.*

Family NITIDULIDAE.

Orthostolus robustus, and other beetles of this family are often found very numerous in the flowers and decaying fruits of many if not all species of Lobelioideae. Some are also found in decaying bark of the dying stems.

Family PROTERHINIDAE.

An undetermined species of this family has been reared from larvae in dead *Clermontia* stems. There may be other species also.

Family SCOLYTIDAE.

A species of this family has been taken in dead *Clermontia* stems.

Family CURCULIONIDAE.

Dryophthorus crassus. This large Cossonid beetle has been taken in abundance in dead *Clermontia* stems.

Oodemas sp. has been taken in similar situations as the above.

ORTHOPTERA.

Family GRYLLIDAE.

Prognathogryllus alatus and *P. stridulans.* These peculiar crickets and other allied species are often found hiding in hollow dead stems of *Clermontia* and other Lobelioideae.

THYSANOPTERA.

Heliothrips haemorhoidalis. Has been collected on *Clermontia parviflora* on Hawaii.

NOTES AND EXHIBITIONS.

Pipunculus sp.—Mr. Rosa exhibited puparia of a Pipunculus fly obtained from leafhoppers on sugar cane at the H. S. P. A. Experiment Station grounds, undoubtedly the same species that was exhibited by Mr. Timberlake at the last meeting,

caught by him on the window at the Experiment Station. Mr. Timberlake stated that the species is near to *P. terryi* of Kauai.

Halymnococcus(?) sp.—Mr. Ehrhorn exhibited the seeds of a branching palm from Egypt which bore specimens of a peculiar Coccid secreting itself under the bracts of the seeds and resembling a sea shell. It probably belongs to the genus *Halymnococcus*. A similar scale has been found on seeds of the native palm (*Pritchardia*) in Hawaii.

Deilephila calida.—Mr. Swezey reported that he and Mr. Bridwell had observed one of these moths at *Metrosideros* blossoms in the daytime on Wailupe Ridge, April 21, 1918.

Cremastus hymeniae.—This Ophionid was first recorded by Marsh in 1910, he having bred it from *Hymenia recurvalis*. Mr. Swezey gave the following list of hosts at present known to him: *Hymenia recurvalis, Nacoleia accepta, N. blackburni, N. monogona, Phlyctaenia calcophanes, P. platyleuca, Phlyctaenia* n. sp. (on *Campylotheca*), *Heterocrossa graminicolor, Cryptophlebia illepida, Tortrix metallurgica, Bactra straminea, Batrachedra cuniculator, Petrochroa dimorpha, Pyroderces rileyi, Ereunetis flavistriata.* A total of 15 species.

Coptotermes.—Mr. Crawford reported this termite having been taken by Prof. Young destroying boxes in a warehouse near the waterfront.

Cryptotermes.—Mr. Crawford reported this termite as taken at the same time as the above destroying shooks in the bundle.

Xyleborus sp.—This Scolytid reported by Mr. Crawford attacking living wood of a monkey-pod tree in Manoa Valley.

Hypothenemus eruditus.—Mr. Crawford reported having bred this Scolytid from twigs of *Amherstia nobilis* last March. The beetles bored thru the central axis of living terminal twigs, killing new growth. The same species was very abundant in dead branches of a monkey-pod tree.

Psyllid types.—Mr. Crawford reported that the types in a

collection of Hawaiian Psyllids of Mr. Giffard's which he had been working up have been turned over to Mr. Giffard who in turn will place them in the Collection of the Hawaiian Entomological Society. The list is as follows: *Trioza lanaiensis, T. pullata, T. hawaiiensis, Hevaheva hyalina, H. giffardi.* The stipulation by Mr. Giffard was that his types should not leave the Territory, altho the Society might itself provide for their disposition in case it could no longer care for them. The remaining of Mr. Crawford's species of Hawaiian Psyllidae have also been turned over to the same collection.

Potassium cyanide inoculation.—Mr. Crawford called attention to a note in Science, page 344, April 5, 1918, in regard to killing Coccidae by inoculating potassium cyanide into trees. He also made some remarks on the very extensive work on Philippine insects and fungi by C. F. Baker, Dean of the College of Agriculture, University of the Philippines.

JUNE 6TH, 1918.

The one hundred fifty-third meeting of the Society was held in the usual place, President Pemberton in the chair. Other members present: Messrs. Ehrhorn, Fullaway, Giffard, Rosa, Swezey, Timberlake, Willard and Williams.

Minutes of previous meeting read and approved.

Mr. Giffard as committee on seeking financial assistance, reported that he had received favorable response from the Trustees of the Hawaiian Sugar Planters' Association. A vote of thanks was extended to Mr. Giffard for his efforts on behalf of the Society.

Committee on Exchanges presented a list of institutions with whom it was considered desirable to offer exchange of publications. It was voted that the Secretary address a letter to each institution inviting an exchange of publications.

PAPERS.

Some Additional Notes on Bruchidae and Their Parasites in the Hawaiian Islands.

BY JOHN COLBURN BRIDWELL.

1. Bruchus sallaei, Sharp, Another New-Found Immigrant.

Acacia farnesiana is one of the immigrant leguminous plants which has found the Hawaiian climate and soils peculiarly well adapted to its needs and is now very widely distributed in the dryer lowlands and lower hills to an elevation of about five or six hundred feet. It is a troublesome spiny shrub which since the time Dr. Hillebrand wrote his account has occupied large areas of pasture lands. In the *Flora* he speaks of it as having occupied areas in the vicinity of the Pearl River Inlet. Its spread is not easy to account for, since the seeds, as large as small peas, do not appear to have any particular means of distribution. It seeds very freely but is attacked by several species of insects which live in the pods and at least three of these are of considerable importance in destroying the seeds. *Cryptophlebia illepida* attacks the pods before the seeds harden and later enters and devours a very large part of the ripening seeds, each larva destroying several seeds. *Myelois ceratoniae* feeds in the pods in much the same way. Several other moths and three or four species of beetles feed in the pods which have been injured in this manner but apparently play no part in the destruction of the seeds. The Bruchid *Caryoborus gonagra* enters the pods from eggs laid on the surface and each larva may destroy one or more seeds. These beneficial attacks have been familiar to all Hawaiian entomologists. Having occasion on May 30, 1918, to examine some of these pods to secure material for the study of *Caryoborus gonagra,* I was interested to find the pods containing another Bruchid closely resembling *Bruchus prosopis* in considerable numbers in the Punchbowl district of Honolulu.

Upon examination this proved to be *Bruchus sallaei* Sharp (Biologia Centrali Americana, Coleoptera 5:475, 1885) previously known from Texas, Mexico and Central America. It is the nearest North American ally of *Bruchus prosopis* and would run to that species in my table of Hawaiian Bruchidae (Proc. Hawn. Ent. Soc. 3:466-468, 1918). It may be distinguished by the much shorter scutellum and by the transverse glabrous impunctate area above the eyes. In *B. prosopis* the scutellum is longer than broad while in *B. sallaei* it is broader than long.

While closely allied to *B. prosopis* and like that species possessing an elongate ovipositor in the female, its egg-laying habits are markedly different. Cushman in his admirable "Notes on the Host Plants and Parasites of North American Bruchidae," (Jour. Econ. Ent. 4:489-510, 1911) has described the egg and recorded as breeding from *Acacia farnesiana, Acacia amentacea,* and *Gleditsia triacanthos* in Texas and recorded it as the host of a large number of parasites. He records it as ovipositing on the pods and I have secured oviposition also upon the seeds. The eggs resemble those of *Caryoborus gonagra* but are smaller, and narrower and tend to be laid in groups of 2-5 partly overlapping. Each larva feeds at the expense of a single seed and practically destroys the seed in its development. It pupates within the seed without making any apparent cocoon and the adult emerges by gnawing away a circular disc of the seed coat. Adults placed in confinement with the pods of *Prosopis juliflora* fed upon the sweet substance of the pulp and oviposited though not very freely upon the pods. From these eggs developed in due time small adults. Whether the species will utilize algaroba pods for breeding in the open under natural conditions remains to be seen.

If *Uscana semifumipennis* is an American insect it is not improbable that it reached the Islands with this species since its eggs are parasitized by it.

This Bruchid has so far only been found on the slopes of

Punchbowl though no adequate effort has been made to find it elsewhere.

2. Bruchus obtectus Say under Another Name.

Alfken (Zoöl. Jahrb. Abt. Syst. 19:572, 1904) reports *Mylabris* (*Bruchus*) *mimosae* Fab. as found by Schauinsland at Pearl Harbor during a voyage in the Pacific in 1896 and 1897. This name was formerly incorrectly, as it is now believed, applied to *Bruchus obtectus* Say. Unless the determination was erroneous then the common bean weevil was here as early as 1897. Possibly, however, the specimens may have been *Bruchus prosopis*.

3. Bruchus prosopis.

Adults emerged May 14, 1918, from eggs secured experimentally in pods of *Prosopis juliflora* between Dec. 27, 1917, and Jan. 4, eggs having been certainly laid on the first date. This gives at least 130 days from egg to emergence of adult. The emergence of the adults was perhaps retarded by the dry condition in which the seeds were kept. This is much the longest period observed for the development of Bruchidae in Hawaii.

4. The Dolichos Weevil Identified.

Specimens of the Dolichos weevil transmitted to Dr. Howard for determination were identified by Mr. E. A. Schwarz as *Pachymerus phaseoli* (Gyllenhal)=*Bruchus phaseoli* Gyllenhal (in Schoenherr Gen. Curc. 1:37, 1833). The species was originally described from Brazil and has been reported as introduced into France and Italy. Whether its host plants have been previously reported the literature at hand does not permit me to ascertain. Probably it has spread with its host plant and is not indigenous to Brazil, which is not rich in legumes related to *Dolichos*.

5. Bruchus pruininus.

This species has been bred experimentally from the following additional hosts: *Cassia siamea, Samanea saman, Acacia decurrens, Sesbania coccinea.* and *Cassia grandis.*

Breeding this from the seeds of the monkeypod (*Samanea saman*) is of interest since we have no local record of this species being attacked by Bruchidae, the seeds being protected by the chambered pods with a gummy or syrupy content.

The seeds of *Cassia nodosa* have a copious albumen and the cotyledons reach the seed coat only along their edges. When the eggs are laid immediately over the cotyledons the larvae are able to penetrate into them and develop. When they are placed over the albumen the larvae are unable to penetrate this and perish.

I have retained a lot of infested seeds of *Sesbania sesban* in which this species was breeding for more than a year and the generations have followed one another until the seed are all practically destroyed. There is then no doubt that the species can maintain itself in storage indefinitely.

6. Bruchus quadrimaculatus.

This species was observed on Maui attacking cowpeas in the field. It is a most serious enemy of the cowpea and pigeon peas in storage but does not appear to attack the latter in the field on Maui.

7. Caryoborus gonagra.

A larva of this species successfully completed its growth during February, 1918, in a pod of *Cassia nodosa* by proceeding from one withered undeveloped seed to another.

8. The Two-Spotted Bean Weevil Identified.

As was suggested this species proves to be *Spermophagus pectoralis* Sharp according to the determination of Mr. Schwarz.

9. Parasites of Bruchidae in Storage.

The practical unimportance of parasites in the control of Bruchidae in stored products was illustrated by conditions in Maui. On account of the shortage of labor due to the war some beans, cowpeas and pigeon peas had been neglected and the latter were heavily infested with *Bruchus quadrimaculatus*. They were so numerous that thousands of the adults were sifted out and practically every one of the cowpeas and pigeon peas stored in loose burlap bags had been destroyed, yet the parasites—principally the Pteromalid supposed to be *"Pteromalus" calandrae*—were also present by the thousands. They are, however, important in reducing the numbers of Bruchidae which emerge from the stored products to scatter and infest the stores elsewhere. Properly fumigated cowpeas and pigeon peas, however, which had only the protection of muslin bags were free from Bruchids.

10. Chaetospila elegans Westwood.

This species was taken at Grove Farm Mill, Haiku, Maui, and in part bred out under conditions which make it certain that it parasitizes both *Calandra oryzae* and *Bruchus quadrimaculatus*.

The male as yet undescribed has the antennae 10-jointed. In both sexes wingless and fully winged forms occur with all the intermediate stages between, the degree of wing reduction often differing in the wings of the same specimen.

This feeble species seems of no importance in controlling its hosts.

11. Uscana semifumipennis Girault.

Out of 5,000 seeds of Adenanthera pavonina picked up principally in Thomas Square in the heart of Honolulu, 3,000 bore eggs of *Caryoborus gonagra* but only six of the larvae reached maturity. Parasitization of the eggs by the Trichogrammatid, *Uscana semifumipennis* Girault seemed to be by far the largest death factor.

On a small lot of pods of *Acacia farnesiana* upon which the eggs of *Caryoborus gonagra* had been deposited in large numbers, taken at Waialua, Oct. 4, 1918, only about 50 per cent of the eggs had been parasitized, leaving enough larvae of the Bruchid to practically destroy the pods. The reason for this smaller percentage was perhaps due to the fact that in this district the only host plants for the Bruchid were *Acacia farnesiana* and *Prosopis juliflora* and these ripen their seed in particular seasons, so that the species does not have continuous breeding places throughout the year and the parasite has a correspondingly limited opportunity for multiplication.

12. Credit Where Credit is Due

The paper in last year's Proceedings, pp. 465-505, was prepared for publication under the pressure of wartime duties in connection with the Selective Service and in the haste of finishing up, it was finally published without recognition of the assistance given me in the preparation of the plant list by Dr. H. L. Lyon, Mr. J. F. Rock and Mr. E. L. Caum. This oversight was particularly regretable since unintentionally certain plants were there first recorded as growing in the Hawaiian Islands. The identifications of all the weedy *Cassias* were made by Mr. Rock.

13. A Correction.

In the discussion of the oviposition reflexes in the former paper on Bruchidae, I had occasion to discuss the habits of a South African Ichneumonid parasitizing *Sarcophaga*. This was referred to under the name of *Allotypa* sp. This is an error. The insect is described elsewhere in this number of these Proceedings as *Atractodes mallyi*.

Some Notes on Hawaiian and Other Bethylidae (Hymenoptera) with Descriptions of New Species.

BY JOHN COLBURN BRIDWELL.

1. Perisierola emigrata Rohwer

This species has been previously known as a predator upon the Pink Bollworm (*Pectinophora gossypiella*), having been bred from that species by Mr. Fullaway in 1911 and later by Swezey, Busck, Timberlake, Pemberton and Willard. On May 30, 1918, while examining pods of klu (*Acacia farnesiana*) I found it abundantly associated with the lepidopterous larvae feeding there. Here were found *Cryptophlebia illepida, Myelois ceratoniae, Pyroderces rileyi,* and *Ereunetis minuscula.* Of these the two former were found attacked under natural conditions while the latter was readily attacked when confined with *Perisierola* and eggs were laid upon the paralyzed larva. *Cryptophlebia* and *Myelois* when full grown are usually too powerful for the *Perisierola* and destroy her with their mandibles when attacked. The smaller ones are, however, usually mastered. The female stings them in three places, in the head region at the throat, and near the middle and at the anal extremity ventrally. Each operation results in violent struggles of the larva during which the *Perisierola* hangs on desperately by means of her mandibles, middle and hind legs and by curving her body tightly about the caterpillar. When one portion of the body is mastered she manipulates portions of it apparently with the object of feeding on its juices.

Oviposition was not observed but apparently takes place an hour or two after she has mastered the larva. The eggs are long elliptical nearly or quite three times as long as broad. They are usually laid flat against the body with their length parallel with it. The number laid seems to bear some proportion to the size of the caterpillar, two eggs having been laid on the little *Ereunetis* larva while eight is a common number

to be placed on the larger caterpillars of *Cryptophlebia* and *Myelois*.

In captivity when placed with other caterpillars the *Perisierola* will attack almost any others besides these. In this way it was bred experimentally from *Ephestia elutella* and *Crocidosema lantanae* and it oviposited upon larvae of *Amorbia emigratella* and *Ereunetis minuscula*. The adults also mastered young Noctuid larvae, the young larva of *Scotorythra rara* and *Hymenia recurvalis*, the larva of *Archips postvittanus* and of *Adenoneura rufipennis*, and the grubs of the Anthribid beetle *Araecerus fasciculatus* and the Bruchid *Caryoborus gonagra*. Upon all of these the adults fed, manipulating the larvae with their mandibles and sucking their juices. If several adults were placed with a small larva they did not oviposit but fed upon them until they were sucked dry.

One female placed with a half-grown larva of *Cryptophlebia* which had already been paralyzed on the evening of May 30 had by the next day laid eight eggs upon its dorsal surface By June 3rd the larvae hatched from these had practically consumed the caterpillar and had reached full growth.

The larva of *Pyroderces Rileyi* was observed vigorously attacking a *Perisierola* placed with it, using its mandibles to bite the abdomen of the wasp. One bit a small *Sclerodermus* placed with it so viciously as to stun it and several with which some *Sierola* had been placed destroyed most of them in a night. Several *Perisierola* placed with a mixed lot of caterpillars from klu pods were destroyed overnight and I have repeatedly had the same thing happen with *Sierola* and *Sclerodermus* placed with other lepidopterous larvae. Lepidopterous larvae do not submit tamely to the attacks of Bethylidae but fight gamely if they have any opportunity.

The Bethylids are cautious in attack and it is probable they frequently attack during the quiescent period at the moults of the caterpillars and thus avoid danger of injury. One female was observed attacking the slender larva of *Ereunetis*. After investigating the head and biting at it and possibly stinging, she

pounced upon its middle and stung it there. This resulted in vigorous contortions of the caterpillar particularly of the anal end. Later she returned to feed at the wound inflicted by the sting. She afterward began working about the thoracic region and apparently succeeded in inflicting a ventral sting near the middle legs after several apparently fruitless efforts in the head region she proceeded to the anal region, where her efforts to sting created another great commotion and contortions, during which she hung on by use of her legs and mandibles and made many attempts to sting but apparently unsuccessfully. She then returned to the head and made several efforts to sting there both dorsal and ventral. The struggles seemed to exhaust her but she remained with the larva which became quiescent. Two hours later she had deposited two eggs.

A female placed with the grub of *Araecerus fasciculatus* after a time attacked it vigorously, the grub making the most violent contortions in its attempts to dislodge the *Perisierola.* She had attacked it at the anal extremity and was keeping hold with her mandibles and hind legs and was constantly attempting stinging. Both finally became exhausted and when the grub was becoming quiescent the *Perisierola* attempted to pierce the skin of the mid-ventral region and apparently succeeded and fed and then rested for some time on the grub now straightened out on its back. From time to time she would abandon the grub and run away, but always returned.

2. Sierola Attacking the Larvae of Cryptophlebia vulpes in the Young Pods of Acacia koa.

Where the ridge leading from Punchbowl to Mt. Tantalus joins the latter and the sharp ascent up to the Tantalus peak begins there are a number of koa trees upon which I have never failed to find adult *Sierolae* whenever looked for, but until June 23, 1918, I had not been able to find to what lepidopterous larvae they are attached. Sweeping the foliage and opening the young pods of the koa then revealed the presence of four species of *Sierola* upon the *Acacia koa* and one at least

of these is attached to the larva of *Cryptophlebia vulpes* as a predator. This moth lives as a larva in the immature pods of the koa, feeding at the expense of the young seeds. During its development the larvae frequently cut their way out of the green pods and enter fresh ones. They finally pupate in the pods from which they have eaten out the seed. The *Sierola* enters the cavity in which the caterpillar has devoured the seed and oviposits upon the larva after stinging it and stupefying it. The larvae completely destroy the caterpillar and from five to seven of them can find food from one larva. Upon reaching full growth they spin silken cocoons within the empty seed cavity and the adult *Sierolae* emerge about the time the pods begin to ripen and change color. In all the pods where *Sierola* larvae and coccoons were found were openings apparently made by the *Cryptophlebia* larvae in entering one pod from another. While I have not been able to make out the details of the stinging of the *Cryptophlebia* larva, the general aspect of the conflict between them is much like that between *Perisierola* and its prey, the *Sierola* attacking with great fury and hanging to the prey with legs and mandibles. They also feed on the juices of the prey as do the other Bethylidae observed. I have seen no indication that they linger with the prey during the larval development.

The koa pods are also injured by the larvae of *Cryptophlebia illepida* and of *Adenoneura rufipennis*. *C. illepida* is too large to be readily mastered by the *Sierola* but doubtless the larvae are occasionally utilized.

The larvae of the species of *Cryptophlebia* attack the koa pods in a later stage of development than *Adenoneura*. The larvae of the latter emerge from the pods and hide elsewhere to pupate. They are also probably used occasionally by the *Sierola*.

A larva supposed to belong to *C. vulpes* was mastered by the *Sierola* and five eggs laid by June 25. These eggs are elliptical in outline perhaps 2 1/2 times as long as broad and rather large in proportion to the mother insect. They are con-

siderably stouter than the egg of *Perisierola* but are more slender than those of *Sclerodermus manoa,* and *S. immigrans.*

While four species of *Sierola* were represented in the material secured from the koa, only one of these has been surely associated with the *Cryptophlebia* larvae in the pods. Much of the material taken from the foliage of the koa belonged to another species which was taken frequently enough to assure its association with some koa insect but no indication was found as to which one.

Another species of *Sierola* was bred (2 ♀ and 1 ♂) on June 5, 1918, from a lepidopterous larva living within the hollow twigs of recently dead *Clermontia kakeana.** The material was taken as full fed larvae on May 26, along the Manoa cliffs trail on the side of Tantalus in the S. E. Koolau Mountains of Oahu. These spun their coccoons on May 27. The coccoons are elliptical rich brown in color and are rather closely woven. They lie nearly touching attached to the inner surface of the wood in the pith cavity.

These species of *Sierola* are in the hands of Mr. Fullaway who is revising the Hawaiian species.

3. Sclerodermus immigrans Bridwell.

One ♀ was found on June 11, 1918, at the type locality and on being placed with *Caryoborus* larva showed much interest and attacked it with its mandibles. The details of the attack were not noted at the time but the *Sclerodermus* was seen to gnaw at the larva in the mid-ventral region apparently with the object of starting a flow of juices. There was a marked preference for the active, full-fed larva over the prepupal stage. Though eggs were seen laid up to June 13, but some were laid after that date and the larvae reached full growth, but no adults were bred out from them. This female was kept alive until July 24, being fed exclusively upon the juices of the larvae of *Caryoborus* and other larvae.

* From material of the same origin brought down at the time Mr. Swezey bred *Thyrocopa* sp. and *Neelysia* sp.; he has also bred from similar material *Opogona aurisquamosa* (Butler).

4. Some Endemic Hawaiian Species of Scleroderмus Latreille.

The first species of this genus was described in 1809 under the name of *Sclerodermus domesticus* (Latreille Gen. Crust. & Ins., 4:119 ♀) and the genus described the following year under the same name (Consid. General, etc., 314). It was altered by Westwood in 1839 to *Scleroderma* in which alteration he has been followed by subsequent writers. We here revert to the original spelling believing that emendations, except for names specifically stated by the author to be misprints, are never admissible.

The first species of the genus from the Hawaiian Islands was described by Sir Sydney S. Saunders under the name *Scleroderma polynesialis* (Tr. Ent. Soc. Lond. 1881:116 ♀). In 1901 Ashmead described as new five (Fauna Hawaiiensis 1:283-286) and tabulated the six supposed species. Dr. Perkins in 1910 (*Op. cit.* 2:612-614) added four more species and the present writer in 1918 added an immigrant species (these Proceedings 3:484). All these species with the exception of one of Ashmead's appear to be valid, though they are uncommon and not easily discriminated. In the course of recent years a number of specimens have been taken, and a few bred, some of these appearing to be new. At present I can say but little of the distribution of the species on the various islands since there appear to be but three individuals in the collections here besides those taken on Oahu. Of these one is the immigrant *S. immigrans* Bridwell, the second appears to be *S. polynesialis* Saunders, while the third is distinct from anything known from Oahu.

In the mountains of the Hawaiian Islands are found numerous elongate caterpillars which have the aspect of Cerambycid beetle larvae and have somewhat the same habits usually affecting wood which has reached a condition of white dry rot. These belong to the genera *Semnoprepia, Hyperdasys,* and *Hyposmocoma.* Being somewhat difficult to breed in the low-

lands our knowledge of them is somewhat limited It is from these caterpillars that all our endemic *Sclerodermus* have been bred.

Sclerodermus polynesialis Saunders.

I am unable to distinguish Ashmead's *S. Perkinsi* from this species, the supposed differences being apparently due to the difference in the conditions of the specimens, the length of the abdomen and the color of the sutures differing with the condition of the specimen.

If my determination is correct this is the species most commonly found on Oahu and has been frequently bred by the author from wood-boring lepidopterous larvae. I have at hand 19 ♀ of this species, all but one of which were secured in the mountains back of Honolulu, one by W. M. Giffard, one by D. T. Fullaway, two by O. H. Swezey and the remainder by the author. I have also a single ♂ bred out with females of this species. A single ♀ was taken by Mr. Swezey in Iao Valley, Maui. The type locality of *polynesialis* was Mt. Haleakala. Maui.

The species is quite variable in size. The thorax is dark piceous but the coloration of the insect is such that it seems black considerably darker than any other of the species I have seen from Oahu.

There is no trace of ocelli in this species.

Sclerodermus poecilodes Perkins.

There are before me two taken in Waialae Nui, Oahu, by Mr. Swezey and two from Tantalus (Bridwell), both lots associated with larvae supposed to be those of *Semnoprepia*, in the dead stems of *Smilax*.

Sclerodermus kaalae Ashmead.

There is before me a single ♀ which I doubtfully refer to this species in which the head and thorax are piceous, the legs and antennae brownish yellow and the abdomen appears black. The margins of the tergites are testaceous but so closely ap-

plied to the following tergites as to show no difference in color. This resembles *polynesialis* but the clypeus is less produced and the abdomen is distinctly tessellate but more feebly so than the thorax. The head also seems more strongly tessellate than in the other species. There is no trace of ocelli.

One ♀, Mt. Kaala in the Waianae Mts., Oahu (Bridwell).

Sclerodermus manoa n. sp.

♀ This species differs from any wingless female *Sclerodermus* known to me except *semnoprepiae,* by its fully developed ocelli. These are arranged in an acute triangle, the hind ocelli distant from the occipital margin about as far as from the anterior ocellus and about six times that distance from the eye margin.

Testaceous yellow; eyes black, tips of mandibles, sutures of flagellum above, extreme base of first tergite very slightly, sublateral patches on its disc, submedian lateral triangular area on either side the second, and similar basal lateral areas on third and fourth, the sixth entirely and the sixth sternite basally slightly infuscate.

Clypeus produced about as long as broad, tectiform, its apex nearly truncate, simple, the sides sraight.

Head more finely tessellate than the thorax and a little more shining. Thorax subopaque from the strong tessellations, sides of pronotum and of propodeum longitudinally lineolate tessellate; the mesopleura with finer tessellations similar to those of the dorsum. Propodeum distinctly narrowed at base, the declivity obliquely truncate.

Abdomen elongate ovate broader than thorax about as wide as the head, highly polished and shining, the hind margin of the first tergite in the arc of a circle, the tergite not quite as wide as the second, measuring where the suture touches the lateral margins.

Length about 3 mm.

This *Sclerodermus* was found in a cavity in a small stub of white rotten wood, probably the remains of a bush of *Scaevola chamissoniana* along the Manoa cliffs trail in the mountains back of Honolulu on May 26, 1918. It was there associated with a limp immobile lepidopterous larva supposed to be that of a species of *Semnoprepia.* The *Sclerodermus* and the caterpillar were placed in a glass tube and brought in for observation. On the next day she had laid five eggs scattered about on the glass of the tube. The eggs were short ellipsoidal, perhaps twice as long as broad, very large in proportion to the size of the adult, and the poles were very slightly different.

On May 29, only four of the five eggs could be accounted for. One had hatched and the larva was attached to the *Semnoprepia* larva and this one alone of the progeny reached full larval growth and it failed to spin its coccoon and transform. A second larva had hatched and was transferred from the glass but failed to develop; this was true of the third larva as well and the fourth egg was unhatched and did not hatch.

The female *Sclerodermus* showed much interest in the caterpillar, the egg and the young larvae, working over them all with her maxillae and palpi. At one time she appeared to be trying to remove the egg from the glass to the caterpillar. More than once she seemed to be trying to bite into the caterpillar for the young larvae. It seems probable though that she was attempting to feed on the juices exuding from the wound made by the feeding of the young larva. By May 31, three new eggs had been laid and only a single larva remained from the first lot of eggs. This was feeding from the abdomen of the caterpillar just in front of the first pair of prolegs. The effects of the adult *Sclerodermus'* feeding was seen in the shrinking of the caterpillar, which was considerably greater than the feeding of the larva would account for. By June 3 the larva was nearly fullgrown and the eggs had not hatched. The caterpillar was greatly shrunken in the middle as the result of the feeding of the *Sclerodermus* larva. The adult was still living and was removed and placed with a larva of *Cryptophlebia illepida* which had been stung by *Perisierola.* She began to eaxmine the anal extremity of the larva with her mandibles and seemingly finding it too active, since it gave a sharp but slight jerk, she reversed and attempted clumsily and slowly to sting it while straight, a posture well adapted to the natural host caterpillar in its burrow but not for the caterpillar lying free in the tube. This operation was repeated several times in a few minutes.

On June 9 a larva* of apparently another genus but the same wood-boring type was brought from the mountains and

* This larva was injured or partly drowned.

placed on June 10 with the ♀ *Sclerodermus*. She showed great interest in it and attempted stinging it but did not succeed while under observation. Her efforts at this time were more of the type of the *Perisierola* than previously. It is evident that sucking the juices of the larval prey is her means of subsistence. By June 13 three eggs had been laid. The larva from the former lot of eggs which reached full growth failed to spin a coccoon or pupate. The female remained alive from May 26, when she was taken, until June 29 feeding readily upon the juices of any caterpillar given her but ovipositing only upon her natural prey. These were always given her paralyzed as a precaution against injuring her. Had circumstances permitted securing proper food for her and her larvae I have no very great doubt that she might have remained alive much longer and that her young might have been bred through to maturity. She did not even refuse to feed upon the juices of the larva of the Bruchid *Caryoborus gonagra*.

Described from a single ♀. Manoa cliffs trail, Mt. Tantalus, Oahu, Hawaiian Islands, May 26, 1918 (Bridwell). Type in the collection of the Hawaiian Entomological Society.

Sclerodermus semnoprepiae n. sp.

♀ Head piceous black; the mandibles piceous, the antennae, thorax, abdomen and legs pale yellow testaceous, flagellum, front coxae and the propleura in front of them and the sutures of the thorax above, sometimes very slightly, petiole, the basal margins of tergites 2-7 seen through the hyaline margins, sting sheath, margins of sternites 2-5 similarly and rest of venter except the last tergite slightly infuscate.

Clypeus triangularly emarginate, the sides not so strongly produced as in *polynesialis*. Ocelli well developed in an equilateral triangle, the posterior ocelli a little further from the eye margin than from the front ocellus and about six times as far from the eye margin.

Head shining tessellate; dorsum of thorax a little less shining more strongly tessellate; sides of pronotum and propodeum longitudinally, mesopleura, vertically lineolate-tessellate; abdomen with the tergum transversely lineolate-tessellate.

Propodeum similar to that of *manoa* but shorter.

Length about 3.25 mm.

♂ Black; legs and antennae infuscate, the margins of the tergites testaceous; wings subhyaline apically slightly grayish, the veins yellowish translucent.

Antennae 13-jointed, the joints of the flagellum except the last subequal a little broader than long, the last nearly as long as the two preceding joints together. Posterior ocelli about as far from the occipital margin as from the anterior ocellus and about three times as far from the eye margin. Eye about one and one-half its length from the occipital margin.

Pronotum strongly narrowed anteriorly about as long as the mesonotum; mesonotum without furrows; scutellum with a transverse suture at base; propodeum about as long as the scutellum and mesonotum together. Wing with a closed median cell the submedian entirely open behind; transverse median interstitial with the basal, there is no trace of venation beside the subcosta, median, and these, which are well developed. Length 2.5 mm.

Described from 12 ♀ and 7 ♂ bred Dec. 1916 from sticks of the living wood of *Coprosma longifolia* attacked by the larvae of an as yet undescribed species of *Semnoprepia* brought down from the windward side of Mt. Konahuanui, Oahu (O. H. Swezey). The species was ascertained to be a predator upon the larvae of this moth.

Type and allotype ♂ in the collection of the Hawaiian Entomological Society. Paratypes in the collection of the Hawaiian Sugar Planters' Association and in the private collections of P. H. Timberlake and of the author.

This species is closely related to *manoa* but the dark head will easily distinguish it. The structure of the clypeus is also different.

The undescribed ♂ of *polynesialis* is very similar but in that species the antennal joints are longer, the abdominal markings are more extensively pale and the venation less strongly developed.

Sclerodermus chilonellae n. sp.

♀ Very similar to *semnoprepiae* but the ocelli rudimentary, the sides of the mesothorax and propodeum the extreme base of first tergite and sides of the abdomen dark, the legs and antennae clear pale yellow. The head varies from reddish to nearly black.

The clypeus is round in front and somewhat expanded. Length about 3 mm.

♂ Similar to that of *semnoprepiae* but the general coloration piceous, legs yellow, antennae yellow infuscate, two yellowish suffused spots on

the base of the scutellum; sutures of the abdomen broadly pale. Length about 3 mm.

Described from five ♀ and 1 ♂ bred by O. H. Swezey from the larva of *Hyposmocoma chilonella* in the rotten wood of *Pipturus* on the Manoa Cliffs trail, Mt. Tantalus, Oahu, May 13, 1909, and from five ♀ bred with others from rotten wood by D. T. Fullaway on Tantalus probably from the same host and even the same tree.

Type ♀ and allotype ♂ in the collection of the Hawaiian Entomological Society; paratypes in the collection of the Hawaiian Sugar Planters' Association, and in the private collection of D. T. Fullaway and of the author.

Sclerodermus Muiri n. sp.

♀ A black appearing species closely resembling *S. polynesialis*, the propodeum less narrowed basally and the clypeus less produced, slightly emarginate in the middle. The sculpture much like that of *manoa*. Head without any trace of ocelli. Length about 2.5 mm.

Described from one ♀ collected at Kilauea, Hawaii (F. Muir) from the collection of W. M. Giffard. Type in the collection of the Hawaiian Entomological Society.

Sclerodermus tantalus, n. sp.

♀ Head testaceous brown, thorax yellow the mesonotum, mesopleurae and sides of propodeum brownish, abdomen piceous black, the margins of the tergites translucent, legs and antennae yellowish.

Head without any trace of ocelli, the occipital distance more than twice the length of the eye, antennae not at all elongate as compared to *poecilodes*.

Head feebly tessellate, thorax more strongly so, abdomen feebly tessellate more strongly on the declivity of the first tergite. The tessellations of the sides of the pronotum are not so long as those of *polynesialis*, the mesopleura coarsely tessellate but the lines bounding the tessellation are not so much impressed as those on the dorsum; sides of propodeum lineolate-tessellate.

The clypeus is not so strongly produced as in *polynesialis* and the anterior margin is inclined to be reflexed. Length about 2.25 mm.

I was at first inclined to identify this as *euprepes* but that is evidently a larger species with the antennae longer and the occipital distance less.

Described from one ♀ collected on Mt. Tantalus, Oahu (Bridwell). Type in the collection of the Hawaiian Entomological Society.

5. Two Cephalonomia Species in Stored Feeds.

Cephalonomia hyalinipennis Ashmead.

What is believed to be this species was found abundantly in the Grove Farm mill, Haiku, Maui, in August and September 1918 upon rolled barley recently imported from California. All the examples taken proved to be ♀'s.

Cephalonomia gallicola Ashmead.

A yellow wingless ♀ found upon the same barley in much smaller numbers agrees with the description of this species and of *C. Xambeui* Giraud. The former was originally bred from galls in Florida and the latter from *Ptinus fur* in a mattress in France. Probably they are the same species. This species and the former when placed with small Tenebrionid larvae taken from the feeds and with the caterpillars of *Ephestia elutella* from the same feeds showed no interest. They were decidedly interested in and attacked the larvae of *Bruchus quadrimaculatus* and *Calandra oryzae* but did not oviposit upon them. They were possibly preying upon the larvae of *Sitodrepa panicea,* adults of which emerged in small numbers from the bags of barley.

6. A New Philippine Goniozus.

Goniozus Williamsi n. sp.

Closely related to and resembling *Goniozus triangulifer* Kieffer by the description but the metanotum with parapsidal furrows and the scutellum with small basal pits on either side and the subcosta, parastigma, and stigma yellowish translucent. The lateral areas of the superior face of the propodeum are finely obliquely aciculate.

♂ The anterior femora of the male are pale brownish yellow and the eyes are larger than in the ♀.

Lenth 2.5 mm.

Described from 4 ♀ and 1 ♂ bred by Mr. F. X. Wil-

liams from a ~~group of~~ lepidopterous larva, probably Pyralid, taken from the foliage of a plant, Los Banos, P. I., Jan. 1917. The coccoons which have been preserved in spirits are stramineous and are spun together in a compact mass 2 x 8 mm.

Type ♀ and allotype ♂ in the author's collection; paratypes in the collection of the Hawaiian Sugar Planters' Association.

7. A Subapterous Bethylid from California.

Arysepyris californicus n. sp.

♀ Black; antennae yellow infuscate from the middle of the *flagellum* on, mandibles piceous at apex, middle and hind trochanters, all the tibiae and tarsi (the middle and hind tibiae suffused with fuscous in the middle) yellow, first tergite with a lateral subapical suffused piceous spot on either side.

Head much broader than the thorax, a little narrowed behind, the occipital distance about equal to the length of the eye; ocelli in an isosceles triangle, the hind ocelli much nearer the ocipital margin than to each other and about five times as far from the eye margin; face carinate between the eyes, the carina not reaching beyond the posterior margin of the lateral (antennal) depressions of the face.

Head and dorsum of thorax strongly and coarsely (microscopically) tessellate, the head evenly punctured with distinct shallow punctures removed from each other about five times their diameter.

Pronotum about as long as the mesonotum and scutellum together, the propodeum a little longer; mesonotum transverse twice as broad as long; scutellum with a narrow transverse sulcus at base, propodeum with the superior face rounded down to the declivity, the microscopic sculpture of the superior face radiating from a longitudinal, smooth area, those on the declivity malleate in appearance. Wings reaching nearly to the middle of the superior face of the propodeum, subovate, rounded at apex, with a costa.

Tergites of abdomen highly polished and shining, with faint transverse lineolations. Length about 4 mm.

Described from one ♀ collected in the sand dune district of San Francisco, Cal., Sept. 8, 1910 (Bridwell). Type in the author's collection.

Arysepyris as a convenience genus established for the reception of subapterous forms which cannot be referred to *Goniozus* and its allies the characters of these genera being mainly venational.

8. Another Philippine Chlorepyris.

Chlorepyris similis n. sp.

♀ Resembling closely and closely allied to *C. flavipennis* Kieffer but differing in the more shining integument of the head and thorax and the finer and sparser puncturation of the head, largely impunctate behind the ocelli, the finer and sparser puncturation of the pronotum, the shorter pronotum and propodeum, and paler, more elongate stigma of the wings, and the paler flavo-piceous tibiae and tarsi. Length 7 mm.; wing 5.5 mm.

♂ The male closely resembles the female. The antennae and legs are more slender and the abdomen smaller, as is characteristic for males.

Length 7 mm.; wing 5 mm.

Described from one ♀ and one ♂ collected at Los Banos, Luzon, Philippine Islands (F. X. Williams). Type and allotype in the author's collection.

9. A New Peregrine Sclerogibbine Bethylid Genus from the Hawaiian Islands.

Lithobiocerus n. gen.

Apparently related to *Mystrocnemis* Kieffer but with the mesothorax strongly contracted into two unequal lobes and with the legs differently developed.

Head flattened above, suboval in the dorsal aspect, truncate behind. The eyes coarsely facetted, rounded, hairy, reaching to the occiput and diverging anteriorly; ocelli none; front produced over base of antennae concealing the antennal sockets and clypeus, its anterior margin revealed snoutlike between the bases of the antennae; antennae inserted between the frontal process (anteriorly) and the clypeus (posteriorly); clypeus declivous, tectiform, carinate at its extreme base, swollen in the middle, its base anterior to its apex. Antennae stout, tapering, 25-jointed, the joints broader than long; labial palpi elongate 6-jointed.

Prosternum massive plane, declivous in front; pronotum arcuately emarginate behind, narrowed behind, about twice as long as broad at base, a little longer than the propodeum, twice as long as the mesonotum; mesonotum contracted before the middle. Propodeum broader posteriorly, obliquely truncate without ridges or carinae. Front tibiae and femora strongly incrassate; hind and middle tibiae about the length of their femora, the front tibiae about one-third as long as its femur and somewhat spoon-shaped. Anterior tarsus with large conspicuous pulvillus between the ungues, inconspicuous on the hind and middle legs; ungues with a subapical tooth; calcaria feeble 1-1-2, those of hind legs unequal. Type *Lithobiocerus vagabundus* Bridwell.

Lithobiocerus vagabundus n. sp.

Front of head and antennae reddish testaceous, the flagellum above infuscate toward the apex; rest of head black, thorax and legs yellowish testaceous, abdomen black, the margins of the tergites, apical tergite, and the margins of the sternites broadly reddish testaceous.

Impunctate and without visible sculpture, the entire body including the eyes, antennae and legs covered with fine rather close short pile.

Length 3.5 mm.

Described from one ♀ collected on the veranda of a house beneath which some mixed feed had been stored in Kaimuki, Honolulu, Dec. 23, 1916. Type in the author's collection.

Undoubtedly an immigrant, possibly from the Orient, where some of its allies are found. Whether it is in any way related to the winged male imperfectly described generically by Ashmead as *Probethylus Schwarzi* will require investigation. It is to be hoped that this form, one of but two ♂'s known in the subfamily, will be described by one of the hymenopterists who have access to Ashmead's material.

10. Cleptes from the Pacific Coast.

The genus *Cleptes* has been variously referred to the Chrysididae and the Bethylidae and to a family of its own related to the two. Certainly it seems more similar to Bethylidae than to the Chrysididae, differing from them largely by the greater development of the true metanotum and the reduction of the apical segments. On the other hand they are about as far removed from the true Chrysididae in the development of the metathorax and the abdominal segments as they are from Bethylidae.

The habits of none of our North American species have been observed. The European species so far as known attack the larvae of saw flies after they have cocooned.

Cleptes aliena Patton.

One ♂ collected June 8, 1910, Josephine Co., Oregon (F. W. Nunenmacher).

Cleptes Blaisdelli n. sp.

♂ Length about 5.5 mm.; width of thorax about 1.5 mm.; length of wing 4 mm.

Abdominal segments 1-3 ferruginous; flagellum, mouthparts, anterior trochanters, knees, tibiae, and tarsi; middle trochanters femora, tibiae, and tarsae, hind trochanters, tibiae, and tarsi, and 5th abdominal tergite nonmetallic, 5th tergite and tarsi more or less piceous, the rest dull black; calcaria testaceous.

Head, thorax and abdomen in general finely and sparsely punctured.

Propodeum coarsely and deeply reticulate at its anterior middle, the ridges evanescent posteriorly and laterally, its posterior margin nearly straight and its angles produced not quite even with the middle, dentiform but not strongly so, sides of propodeum smooth and shining, 1st tergite smooth and shining; 2nd tergite smooth with fine deep evenly placed punctures, 3rd and following finely rugulose with confluent setigerous punctures. Wings brownish, tegulae metallic with a brown posterior discal spot.

Described from one ♂ collected by Dr. F. E. Blaisdell May 15, 1884, at Poway, Cal. Type in the author's collection.

This fine species does not resemble any of the described American species, the red abdomen abundantly distinguishing it.

Cleptes purpuratus Cresson.

The account of this species in Aaron's Chrysididae is misleading. The abdomen of the female is not at all similar in color to the thorax and in the ♂ the reflections are feeble.

♀ Head, thorax and legs to the femora metallic green with various cupreous and golden reflections, the propodeum blue green, antennae legs beneath the metallic reflections and the abdomen piceous brown, the tibiae and tarsi more testaceous.

Head and pronotum rather coarsely and sparsely punctured, the surface between somewhat uneven, but highly polished and shining; the surface of mesonotum smooth highly polished and shining with finer sparser punctures, scutellum much the same, the punctures obsolescent, metanotum with the lateral depressed areas or pits dull, blue, propodeum with the superior face irregularly reticulate throughout with two fine converging carinae about one-third the distance from the sides to the middle, its posterior carina well defined nearly straight, the lateral angles dentiform; mesopleura polished, rather sparsely coarsely punctured, metapleura and sides of propodeum striate.

Abdomen flattened above, highly polished, particularly the impunctate 1st tergite, 2-4 finely, evenly, and closely punctured excepting on the posterior margins. The apical segment of the abdomen is indicated by a tube extending from the 4th segment.

There are some obscure metallic reflections on tergite 4.

Wings brownish hyaline.

♂ Resembles the ♀ but the head smaller, the antennae longer; the propodeum is more golden in coloration, reticulation of the propodeum is more regular in the middle and less complete laterally; the surface is less even and the posterior marginal carina less complete, the lateral angles less acute. The abdomen has greenish reflections on all the tergites at least laterally, the surface is less highly polished and more convex, the punctures are less definite on segments and there is more pilosity on the surface.

Five tergites can be seen, the fifth very small.

The legs have the tibiae dark with greenish reflections and the reflections on the femora are very much stronger.

One ♀ Corvallis, Oregon, Sept. 15, 1907. One ♂ Pamelia Lake, Mt. Jefferson, Oregon, July 17, 1907 (J. C. Bridwell).

NOTES AND EXHIBITIONS.

Maui insects.—Mr. Giffard exhibited a collection of insects representing six days collecting by himself and Mr. Fullaway on the island Maui.

Ascyltus penicillatus.—Mr. Pemberton exhibited a male of this large spider a pair of which he had found on vanilla in Kona, Hawaii. The female had been sent to Washington for determination.

Kelisia.—Mr. Fullaway exhibited eggs of this leafhopper in bunch grass, parasitized by a species of *Anagrus.*

Pseudococcus straussiae.—Mr. Ehrhorn stated that he had collected this mealybug at Kilauea, Hawaii, and that it was parasitized by the same species of *Anagyrus* as is obtained from it on Oahu.

Trionymus insularis.—This mealybug was reported by Mr. Ehrhorn as taken on *Deschampsia* at 29 miles, Kilauea, Hawaii.

Pipunculus sp.—Mr. Timberlake exhibited specimens of a species of Pipunculus fly, four of which were obtained by Mr. Williams in field 40, Oahu Sugar Co.'s plantation. A fifth specimen was bred by Mr. Rosa from material collected in cane

at the Experiment Station. All come near to *P. terryi* described from Kauai. Two specimens of the latter species were exhibited, collected recently by Mr. Timberlake at Grove Farm, Kauai.

Proterhinus maurus.—Mr. Swezey exhibited a specimen of this, the largest species of this genus of beetles. He also exhibited twigs of the large-leaved *Suttonia* (considered a distinct but undescribed species by Mr. Rock), collected by Mr. Bridwell May 23rd, on Mt. Olympus, showing the work of the larvae of this beetle. The adult beetle exhibited had bred out after the twigs were brought down. Mr. Swezey called to attention that in the Fauna Hawaiiensis Dr. Perkins recorded this *Proterhinus* from *Pelea,* which is an error, as the original specimens were collected from this same large-leaved species of *Suttonia.*

AEgosoma reflexum.—Mr. Swezey exhibited a larva and a pupa of this Prionid beetle taken from a dead and rotten ohia tree beside the Mt. Olympus Trail, May 23rd, 1918. There were a good many larvae of various sizes in the tree. This indicates that the species is common on this island, whereas a few years ago it was considered rare.

Nesosydne koae.—Mr. Bridwell reported the finding of this leafhopper on koa in the new planting of *Acacia koa* on Sugar Loaf, May 26th.

Cerambycid in pods of Acacia farnesiana.—Mr. Bridwell reported that on May 30th, 1918, while examining pods of *Acacia farnesiana,* recently-dead pods were found rather frequently infested by a Cerambycid. The same species was found previously in old lima bean pods, and is the one previously reported bred from dead petioles of papaya (*Carica papaia*).* The larvae are pugnacious and attack others when placed in the same box, and in no case was more than one larva found in a pod. The pods attacked were apparently those previously moth-eaten by the Tortricid *Cryptophlebia illepida.*

* Proc. Haw. Ent. Soc., III, p. 388, 1918.

JULY 11TH, 1918.

The one hundred fifty-fourth meeting of the Society was held in the usual place, President Pemberton in the chair. Other members present: Messrs. Bridwell, Ehrhorn, Fullaway, Kuhns, Rosa, Swezey, Timberlake and Willard.

Minutes of previous meeting read and approved.

The Secretary read a letter from the Trustees of the Hawaiian Sugar Planters' Association stating that $350. yearly had been appropriated by the Association toward the expenses of publication of the Proceedings.

A vote of thanks was extended to the Association.

A communication was read from the Washington Entomological Society enclosing a set of rules adopted by that Society for the guidance of the Editor in the publication of new species in the Society's publications, and asking our Society to adopt them. The matter was referred to a Committee composed of Messrs. Swezey, Bridwell and Timberlake.

PAPER.

Notes on Nesomimesa antennata (Smith) (Hymenoptera).

BY JOHN COLBURN BRIDWELL.

Mr. Williams' observations* on the habits of the Hawaiian species of this genus has confirmed the opinion some of us have held that the observations of Dr. Perkins in regard to this genus attacking craneflies were in some way exceptional or peculiar and that the real habits would be found different. Mr. Swezey had previously found the Oahu species carrying leafhoppers of the Cixiid genus *Oliarus*. On June 9, while collecting upon the Lanihuli ridge bounding Nuuanu Valley to the north-west, *Nesomimesa antennata* (Smith) was found in very large numbers flying about in the drizzly rain over the

* See pages 63-68 following. [Ed.]

staghorn ferns (*Gleichenia dichotoma*). A great majority were males but an occasional female was found and when one of them settled on a leaf the males would swarm about her but actual mating was not observed tho I do not doubt that had I taken time to watch it might have been observed. One female was seen carrying something beneath her thorax apparently between the legs of the middle and hind pairs. Upon capturing her this was found to be an adult *Oliarus,* probably *kaonohi* Kirkaldy, which is commonly found on this fern. From my previous observations of the places in which this species is found in numbers I have no doubt that the normal prey of this species is made up of the native leafhoppers as would be expected on account of the habits of Mimesids elsewhere.

Bruchidae of the Helms Collection (Coleoptera).

BY J. C. BRIDWELL.

The Bruchidae of the Helms collection of Australian insects at the Bishop Museum have been cleaned and remounted. Only three species are represented.

Bruchus semicalvus Lea. Proc. Linn. Soc. N.S.W., 33:638. 1898. Sydney, Sept. 2, Oct. (Helms).

Bruchus diversipes Lea. Proc. Linn. Soc. N S. W., 33. 640, 1898. Sydney (Carter).

Bruchus obtectus Say.
North Sydney.

NOTES AND EXHIBITIONS.

Pectinophora gossypiella.—Mr. Bridwell exhibited a specimen of the pink boll-worm bred from the native cotton, *Gossypium tomentosum.* Out of 66 bolls, two showed infestation, and only one larva matured.

Minthea rugicollis.—This rare beetle reported caught at light indoors by Mr. Bridwell.

Opius lantanae.—From a lot of lantana seeds collected in the Punchbowl district of Honolulu, Mr. Bridwell reported that more of this Braconid issued than of its host the Agromyzid seed-fly.

Microbracon pembertoni.—This parasite of the pink bollworm, Mr. Bridwell reported as having been bred from *Cryptophlebia illepida.*

Derebroscus politus.—Mr. Bridwell reported having again taken this Carabid beetle on Lanihuli Ridge.

Hydrophillid.—Mr. Bridwell exhibited specimens of a small beetle possibly a Hydrophillid found associated with ants at Waianae at sea level.

Pteromalid.—Mr. Bridwell reported having found another Pteromalid which will attack Bruchids.

Neelysia mactella.—This moth reported by Mr. Bridwell as bred from webs in moss.

Enarmonia walsinghami.—This Tortricid moth reported by Mr. Bridwell as bred from koa pods.

Cryptophlebia parasites.—Mr. Bridwell reported having bred *Pimpla hawaiiensis, Cremastus hymeniae* and *Omphale metallicus* from *Cryptophlebia* in koa pods, probably both *illepida* and *vulpes.*

Cecidomyid.—Mr. Bridwell reported breeding a Cecidomyid from the remains of the seeds of a Livistonia palm which had been destroyed by a Scolytid beetle.

Chalcolepidius erythroloma.—Mr. Swezey exhibited a specimen of this large Elaterid beetle reared from a nearly full-fed larva found in a standing dead trunk of *Maba sandwicensis* at Niu, February 10th, 1918. As there were termites and moth larvae (*Semnoprepia* sp.) present, it was taken to be predacious. It had been fed on *Adoretus* grubs, flies and ground roaches, and molted on the following dates: Feb. 20, March 17, April 22. It pupated June 11, and became adult June 26. It was about a week becoming hardened up.

Dolichurus stantoni.—This wasp which is parasitic on roaches (*Phyllodromia* spp.) was introduced from the Philippines in 1917, a few being liberated in Makiki Valley in June and October of that year. Mr. Swezey reported recently finding them in the cane fields at the Experiment Station, H. S. P. A., thus indicating that it has become established.

Epeleytes draptes.—Mr. Swezey exhibited a specimen of this bug taken by him at light in Kaimuki, June 30th. The type specimen was collected by him in an old dead bean pod (*Canavalia* sp.) of a vine growing on a stone wall at Koloa, Kauai, August 2nd, 1908. It was described by Kirkaldy in Proc. Haw. Ent. Soc., II, p. 119, 1910. Since the first capture there has been no other record of its capture till now. Mr. Timberlake reported capturing 4 specimens at light in Kaimuki, June 29th to July 8th.

Genophantis leahi.—Mr. Swezey reported having reared this Phycitid moth from *Euphorbia* n. sp. collected by Mr. Rock on Molokai, May 30, 1918. It is the first record of this moth from Molokai.

Lycaena boetica.—This butterfly was reared by Mr. Swezey from *Sesbania tomentosa* collected by Mr. Rock on Molokai, May 30, 1918.

Xiphidium varipenne.—Mr. Swezey exhibited some pods of *Acacia farnesiana* which had had the outer surface eaten off. He had observed some of the *Xiphidium* grasshoppers in the act of doing this. It was in the region lying on the slope beyond Kaimuki toward Waialae.

Java insects.—Mr. Ehrhorn exhibited a small collection of insects from Java.

Elachertus sp.—Mr. Timberlake exhibited this small Chalcid reared from *Hypothenemus* by Mr. Crawford.

Rhopolotus sp.—Mr. Timberlake exhibited a prettily marked yellowish and green species of an Entedonine, taken in grass at Lihue, Kauai, recently, which runs to this genus.

Tortricid in apricot.—Mr. Rosa exhibited a Tortricid moth recently reared from an apricot fruit from California.

AUGUST 1ST, 1918.

The one hundred fifty-fifth meeting of the Society was held in the usual place, Vice-President Timberlake in the chair. Other members present, Messrs. Bridwell, Ehrhorn, Fullaway, Mant, Osborn, Potter, Rosa, Swezey, Wilder, Willard and Williams.

Minutes of previous meeting read and approved, with corrections.

The Committee appointed at the last meeting to consider the rules adopted by the Washington Entomological Society to apply to the publication of entomological descriptions and papers, submitted its report, which is embraced in the following rules and suggestions:

Rules and Suggestions Applying to Types and Entomological Descriptions and Papers in the Publications of the Hawaiian Entomological Society.

RULE 1. No description of a new genus, or subgenus, will be published unless there is cited as a genotype a species which is established in accordance with current practice of zoological nomenclature.

RULE 2. In all cases a new genus, or subgenus, must be characterized and if it is based on an undescribed species the two must be characterized separately.

RULE 3. No description of a species, subspecies, variety or form will be published unless it is accompanied by a statement which includes the following information, where known (1) the type locality, (2) of what the type material consists —with statement of sex, full data on localities, dates, collectors, number of specimens, etc., and (3) present location of type material.

RULE 4. In the discussion of type material of insect species, the following terms shall be used in the sense as defined below:

Type series. All the specimens studied by the author at or before the time of the completion of the description and specifically mentioned in the description.

Type=holotype. One individual selected by the author to represent the species.

Allotype. One individual of the opposite sex from the type selected by the author from the type series to represent that sex.

Paratypes. The other specimens of the type series besides the type.

Cotypes. Members of the type series when no individual has been selected by the author as a type.

Lectotype. An individual selected from a cotype series subsequently to the publication of a description to take the place of a type.

Neotype, metatype, topotype. This Society disapproves of the use of these terms, or any other word containing the radical "type," except as applied to material before the author at the time of the completion of the description. If an author desires to employ any other terms with reference to type material, these should be defined in the paper in which they are used.

RULE 5. No unsigned articles, or articles signed by pseudonyms or initials, will be published.

RULE 6. The ordinal position of the group treated in any paper must be clearly given in the title or in parentheses following the title.

SUGGESTION 1. All illustrations accompanying an article should be cited in the text and preferably in places where the object illustrated is discussed. All plates should be provided

with designation of figures, if any, explanations, and citation of text pages.

SUGGESTION 2. It is desirable in describing new genera and species that their taxonomic relationship be discussed, and that distinguishing characters be pointed out.

SUGGESTION 3. In all cases in the serial treatment of genera or species and where first used in general articles the authority for the species or genus should be given, and the name of the authority should not be abbreviated.

SUGGESTION 4. Where the title of any publication referred to is not written in full, standard abbreviations should be used.

SUGGESTION 5. When a species discussed has been determined by someone other than the author it is important that reference be made to the worker making the identification.

NOTES AND EXHIBITIONS.

Thecla echion.—Mr. Williams recorded the rearing of this butterfly from larvae feeding on pods and seeds of *Cordia sebestena.* The larvae pupated June 21, and the adults appeared July 5.

Nesophryne sp.—Mr. Swezey exhibited specimens of this large Jassid captured on the ridge known as Malamalama on the windward side of Mt. Konahuanui. He and Messrs. Bridwell and Timberlake collected 13 adults off *Clermontia kakeana* and 1 off *Byronia.* The known species of this genus occur only on Kauai. These are the first found on Oahu, and probably constitute two new species.

Bombycid cocoons.—Mr. Ehrhorn exhibited some very remarkable cocoons, probably of species of *Cecropia*—one from Bolivia and one from Japan.

Termites from yams.—Mr. Ehrhorn exhibited specimens of termites taken in a shipment of yams in his quarantine inspection work.

Insects from Jahore.—Mr. Mant exhibited a small collection of attractive insects from Jahore, Malay Straits—moths found in a garden, beetles from the forest, and a blue chrysidid found in a railway tie.

Insects from Barbados.—Mr. Wilder exhibited the following insects recently received from Barbados: *Diaprepes abbreviatus, Phytalus smithi,* both of which are the adults of sugar cane root grubs; *Tiphia paralella,* a parasite on the grubs of *P. smithi.*

Nesodryas perkinsi.—Mr. Timberlake exhibited a male of this Delphacid taken on *Clermontia kakeana* at Malamalama, July 28.

Nesodryas bobeae.—Mr. Timberlake exhibited a female of this Delphacid collected on Palolo Ridge, April 8th, 1917. This species has not been collected since 1905.

Diachasma tryoni.—This Braconid parasite of the Mediterranean fruitfly was reported common by Messrs. Wilder, Swezey and Fullaway, all having found it working on infested fruit in Honolulu gardens.

SEPTEMBER 5TH, 1918.

The one hundred fifty-seventh meeting of the Society was held in the usual place, Vice-President Timberlake in the chair. Other members present: Messrs. Ehrhorn, Fullaway, Giffard, Potter, Swezey and Williams. Mr. Fordyce Grinnell, Jr., was a visitor.

Minutes of previous meeting read and approved.

The Secretary was instructed to prepare copies of the rules for the preparation of descriptive papers adopted at the last meeting and distribute the same to the active members.

On the Genus Ilburnia White (Homoptera, Delphacidae).

BY F. MUIR.

(PRESENTED BY W. M. GIFFARD.)

Ilburnia White 1878, Proc. Zool. Soc., Lond. p. 471. subgenus of *Liburnia* Stal.

Nesosydne Kirkaldy 1907. Proc. Haw. Ent. Soc. I. p. 161.

In the British Museum collection there are two female specimens under the name of *Ilburnia ignobilis* White, collected by Wollaston on Diana's Peak, St. Helena. The type is in good condition but the second specimen, which is smaller and darker and represents another species, is without tegmina. The shape of the tibial spur places them among the Alohini and there is no structural difference to separate them from *Nesosydne* Kirkaldy. *Delphax simulans* Walker, collected by Darwin in the Galopagos Islands, also has to come into the same genus although it is not quite typical. This makes the present known geographical distribution for this genus, Hawaiian Islands, with many species, Galopagos Islands, with one species, and St. Helena, with two species. *I. ignobilis* White and *I. simulans* (Walker) are redescribed below.

Unfortunately the name *Nesosydne*, so well known to our local collectors, will have to give place to *Ilburnia*.

Ilburnia ignobilis White.

Head much narrower than thorax; vertex slightly longer than width of the base, apex narrower than base; length of face a little more than twice the width, slightly narrowed between the eyes, median carina simple; clypeus tricarinate; antennae long, reaching to apex of clypeus, terete, joints subequal in length, second slightly thicker than the first. Pronotum and mesonotum tricarinate, lateral carinae of pronotum diverging, straight, reaching hind margin. Tegmina not reaching to the middle of abdomen, truncate at apex. Legs long, slender, first hind tarsus longer than second and third together, spur nearly as long as first tarsus, nar-

row, cultrate, thick, convex on both surfaces, or very slightly flattened on inner surface, nine large teeth on hind margin.

Yellow or light brown, darker between carinae of head and thorax, nearly black between carinae of face, two broken, darker medio-lateral stripes down abdomen. Tegmina hyaline, yellowish, veins, concolorous with membrane, granules small, sparse, with yellow hairs.

Length 4.6 mm.; tegmen 1.7 mm.

One female from Diana's Peak, St. Helena (*Wollaston*).

The second specimen under this name from the same locality represents another species but is not in good enough condition to describe.

Ilburnia simulans (Walker).

Delphax simulans Walker, List of Hom. Insects II. p. 355 (1851).

Male. Head slightly narrower than thorax; vertex slightly longer than width at base, perceptibly narrowed to apex, carinae normal; length of face nearly double the width, narrowest between eyes, broadest slightly distad of middle, median carina simple; antennae reaching to apex of face, terete, first joint about half the length of the second; pronotum tricarinate, lateral carinae straight, diverging posteriorly, reaching hind margin, mesonotum tricarinate. Legs comparatively short, first hind tarsus sub-equal to the second and third together, spur small, about two-thirds the length of first tarsus, cultrate, thick, both surfaces convex or with the inner surface very slightly flattened, ten small teeth along the hind margin.

The form of the tibial spur places this species in *Ilburnia* of the Alohini, oherwise it would be best placed in *Kelisia*.

Head, thorax and legs light brown, carinae and antennae lighter, abdomen dark brown. Tegmina reaching half way down the abdomen, hyaline, light brown, a dark brown mark at the apex of clavus, slightly brownish over basal area of tegmen.

Length 2.2 mm.; tegmen 1.3 mm.

Two specimens from James Island, Galopagos Islands (*C. Darwin*).

Female similar to the male but the abdomen slightly lighter.

Length 2.6 mm.; tegmen 1.3 mm.

Three specimens, one from Charles Island and two from James Island. (*C. Darwin.*)

There is one specimen from James Island without an abdomen which I believe to be a male. Two nymphs from James Island, dark brown, marked with light down the middle of abdomen and on head and thorax, with two median facial carinae and the antennae are short, the first joint about as long as wide.

Notes on Collection of Hawaiian Insects on Island of Maui.

BY D. T. FULLAWAY AND W. M. GIFFARD.

Notwithstanding the very rainy weather which prevailed on the Island of Maui during last June, several short collecting trips were made on the slopes of Haleakala, the Wailuku Commons and in the western part of the Island. Altogether attempts were made to collect on five separate days, but the continuous rain, drizzle and fog on the mountain and in the valleys were such that the vegetation and collecting outfits were thoroughly saturated most of the time. Because of this, much inconvenience in collecting and losses in insects were sustained and results were less satisfactory than they might have otherwise been. During the entire period a total of twelve hours actual collecting was all that could be obtained.

The most favorable locality on this visit was Olinda, along the pipe line, at an elevation of 4200 feet. There is a fair automobile road up to within a mile of the lower end of the trail, the latter extending for some distance into an interesting forest region. The further along this trail the weather and other conditions allow one to tramp and collect the more interesting it becomes. Unfortunately the weather did not permit us to penetrate very far from our headquarters although two attempts were made. Even under the existing conditions there were collected several very interesting species of Carabids including *Baryneus sharpi, Atelothrus, Metromenus, Metrothorax* (two species) and others undeterminable, *Ptagithmysus pennatus*, and *finschi, Clytarlus vestitus, Proterhinus lecontei,*

brevipennis and several other species, *Acalles humeralis, Parandrita aeneus,* and several species of *Oodemas,* among the Coleoptera; *Anomalochrysa soror,* an Aphis lion; *Odynerus camelinus, nivicola, erythrostactes, Nesoprosopis difficilis, Deinomimesa haleakalae,* among Aculeates, and one *Eupelmus,* one *Pleuroneurophion, Enicospilus molokaiensis* and *Scleroderma polynesiale,* among the Parasitica; and of Homoptera several species of Jassids and several of *Oliarus* and 4 new species of Delphacids which will be described later on. Unfortunately among the latter the males were sparse in individuals only two or more of the species having been taken in series of both sexes with nymphs. So far as it was possible all food plants of the species were recorded for convenience of others who may desire to explore this interesting region.

A day or two later a short visit was made to the new Hamakua ditch trail (Lupe) but the road to this region was almost impassable and much time was lost in getting there. The forest here is at an elevation of approximately 1200 feet and is not nearly so interesting as that near Olinda. The indigenous vegetation is much more sparsely distributed because of destruction caused by stock; and foreign weeds and grasses have crept in and are destroying much of the indigenous growth. It rained almost constantly on the day of our visit and in consequence there was not much to record from this region other than one new species of *Nesosydne* and several Jassids amongst the Homoptera and *Odynerus ecostatus, camelinus* and *instabilis* among the Aculeates.

A morning was spent on the Wailuku Commons but the indigenous vegetation on these sand hills has become very sparse due to continual pasturing of cattle and use of large portions of the locality in recent years for the growth of sugar cane and other purposes. On *Coreopsis mauiensis* a large series of what is apparently a new *Nesosydne* was taken but Aculeate Hymenoptera, particularly the low land species of *Odynerus* and *Nesoprosopis* which were formerly quite abundant in the

region, were almost absent at this time. One *Proterhinus* and four *Oronomiris hawaiiensis* were also taken.

A short visit in the direction of Lahaina was made in fine weather but here again many of the interesting lowland and coast forms of Aculeates were comparatively scarce except in the commonest of species—*Odynerus purpurifer, insulicola, smithii, rubrotinctus, Nesoprosopis facilis, Crabro mandibularis,* and one Carabid were taken. On *Ipomoea pes-caprae, I. insularis* and *I. platyphylla* a series of Delphacids (*Aloha* sp.) were taken but all these are apparently the common *A. ipomoeicola.* The extreme variations in color of this Delphacid as captured on these three species of *Ipomoea* is very marked and notwithstanding that all were taken at practically the same elevations and within a few hundred feet of each other. There is room for study as to why these extreme variations in the color exist in some of our commonest Delphacids, and the theory already advanced in Mr. Muir's notes on Hawaiian Delphacids that this variation is caused in part by the food plant appears plausible to some extent.

On the day of our return to Honolulu a short visit was made to Iao Valley, weather conditions being such as to prevent a previous tramp in that region. The trails into the valley at the time were practically impassable because of heavy rains, so that we were only able to get as far as the first crossing of the Wailuku river. At this point on a small area of *Eragrostis variabilis* a long series of both sexes and young of a new species of *Kelisia* was obtained. This is the first species of that genus of Delphacids taken on Maui so far as is known. One *Proterhinus,* several Jassids and *Odynerus ecostatus* and *purpurifer* were also taken.

Description of Paranagrus osborni n. sp. (Hymenoptera, Mymaridae).

BY D. T. FULLAWAY.

Paranagrus osborni n. sp.

♀ .6 mm. long, flavous, head smoky with some black markings, abdominal tergites, all the joints of the flagellum and the valves of the ovipositor fuscous. Very similar to *P. optabilis* but smaller in all proportions. Length of wings .48, length of valves of ovipositor .25, length of valves to the suture .18. There is a constant difference in the proportionate length of the two sections of the valves on either side of the suture. In *P. osborni* it is 1:3.4; in *P. optabilis* 1:3.

♂ pallid, markings fainter; distal antennal joints broken off.

Type locality—Los Banos, Philippine Islands. Bred from eggs of *Peregrinus maidis,* by H. T. Osborn, 1915. Type and 16 paratypes including 1 ♂ on three slides. Types in the collection of the H. S. P. A. Experiment Station, Honolulu.

NOTES AND EXHIBITIONS.

Maui insects.—Mr. Giffard exhibited four boxes of insects collected on Maui in June, and gave notes on the Delphacids in the collection, some of which were new species. He also exhibited specimens of a new species of *Kelisia* and a new species of *Ilburnia* and a number of Jassids collected on Molokai in June by Mr. J. F. Rock.*

Holochlora venosa.—Mr. Swezey exhibited a specimen of this large green Locustid or katydid, collected by Mr. Charles Atherton at Luakaha in Nuuanu Valley, where he said that they had recently appeared quite common. Mr. Timberlake reported that he had bred *Anastatus koebelei* from eggs of this katydid brought in by Mr. Rosa. The parasites had emerged six weeks after the eggs were brought in.

Oxya velox.—Mr. Swezey reported the finding of a small

* The new species of Delphacids in the collections exhibited have been worked by Mr. F. Muir. See his paper farther on in this issue.

colony of this grasshopper at Haiku, Maui, August 24th. It has been known on Oahu and Kauai since 1897, but has not previously been reported from Maui.

Scolia manilae.—Mr. Swezey reported observing a male specimen of this introduced Philippine wasp in his garden at Kaimuki, Sept. 2nd. A colony of female wasps had been liberated there several months previously, and this is the first evidence of their having become established there and breeding on the grubs of *Adoretus.* Mr. Timberlake reported having recently observed one of the wasps on the window at the Experiment Station.

Euphorbia insects on Maui.—Mr. Swezey exhibited the following insects collected by him on *Euphorbia* in Iao Valley, Maui, August 8th, 1918, in each case being the first record of these insects from Maui:

* *Dictyophorodelphax* n. sp. Different from the two species occurring on Oahu.

Jassid. Apparently closely related to an undescribed species that has been collected abundantly on *Euphorbia* on the coral plain below Ewa Mill, Oahu.

Ithamar n. sp. Apparently the same undescribed species of bug that was collected on *Euphorbia* on Niu Ridge, and at the Pali, Oahu.

Cimex lectularis.—Mr. Fullaway exhibited specimens of the bed-bug with eggs and nymphs. Six eggs were laid by one female and they hatched in seven days. The young frequently sought protection beneath the body of the mother. All were active after a week in confinement without food.

Pentarthron flavum.—Mr. Fullaway reported breeding this Trichogrammatid from the eggs of *Lycaena boetica* and *Pectinophora gossypiella.*

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* Described on page 72 following. [Ed.]

OCTOBER 3RD, 1918.

The one hundred fifty-seventh meeting of the Society was held in the usual place, Vice-President Timberlake in the chair. Other members present: Messrs. Bridwell, Crawford, Ehrhorn, Fullaway, Giffard, Langford, Rosa, Swezey and Williams.

Minutes of previous meeting read and approved with corrections.

Mr. Fordyce Grinnell, Jr., was elected to active membership.

PAPERS.

Epyris Extraneus Bridwell (Bethylidae), a Fossorial Wasp That Preys on the Larva of the Tenebrionid Beetle, Gonocephalum Seriatum (Boisduval)

BY FRANCIS X. WILLIAMS.

Epyris extraneus was first taken in the Hawaiian Islands by Swezey in October and November, 1915, on the grounds of the Experiment Station of the Hawaiian Sugar Planters' Association at Honolulu, Oahu. Subsequently he found it in 1917 on the island of Maui. It is now quite abundant on Oahu where it seems more partial to the lowlands and can be taken at all seasons of the year. Bridwell, who described this *Epyris,* (Notes on a Peregrine Bethylid, Proc. Haw. Ent. Soc. for 1916, Vol. III, No. 4, pp. 276-279, 1917), also identified specimens from Los Baños, Philippines, as belonging to this species and so it seems probable that it has a fairly wide Oriental distribution.

Very little is known about the life-history of the genus *Epyris.* Bridwell (A note on an *Epyris* and its Prey, Proc. Haw. Ent. Soc. for 1916, Vol. III, No. 4, pp. 262-263, 1917) found an *Epyris* sp. near Capetown, South Africa, dragging a small tenebrionid larva between its jaws, and in the same

article speaks of H. T. Osborn, of this Station, as having found, in September, 1915, near Pearl City, Oahu, a tenebrionid larva externally parasitized by a grub, and he concludes that the latter must have been *Epyris*. During August and September, 1918, I succeeded in rearing, from egg to adult, six males and one female of *Epyris extraneus* Bridwell from the larva of *Gonocephalum seriatum*. The adult *Gonocephalum* (Fig. 1) is a stout oval, dull black beetle 8 or 9 millimeters long, very abundant at low levels, where it occurs under clods of dirt, cane trash and other rubbish. Its larva (Fig. 2) is quite slender, firm and cylindrical, of yellowish and brown or straw color and at maturity is about 17 millimeters long. It is a vigorous insect bearing a superficial resemblance to a wire-worm (Elateridae), but does not appear to be injurious, and in cane fields is probably a trash feeder. On being dug out of the ground it usually "plays possum" for a brief instant and then hastens to get under cover, burying itself with commendable speed.

The black *Epyris* wasp (Fig. 3, female) is far smaller than the larva it attacks; the female is about 6 mm. long and the male often a little smaller. The female especially, is a strongly made, lithe insect with stout jaws and legs, a good flyer and a better digger, surpassing in the latter respect the *Scolia* wasps which in habits it somewhat resembles. One *Epyris* which I enclosed from August 5th to 18th with a number of *Gonocephalum* larvae in a tumbler partly filled with earth, stung and parasitized 13 larvae. Two other wasps kept for a short time laid 2 and 3 eggs respectively. The wasps mandibles are of a rather unusual type, but well fitted for gripping, being stout and somewhat recurved at the tip. It is to be noted, however, that (under my limited observations) she selects larvae within a certain limit of size, i. e. from about 13.5 to nearly 16 mm. long; these do not appear to be in the last instar, when they are probably *too* powerful for her to overcome. The prey though rendered helpless is not stung to complete immobility; it is still capable of weak mouth and

Proc. Hawaiian Ent. Soc., IV, Plate I.

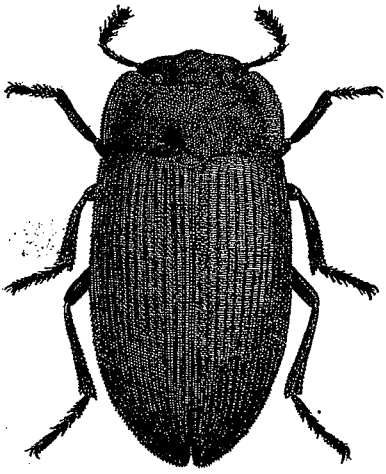


Fig. 1.
Gonocephalum seriatum.

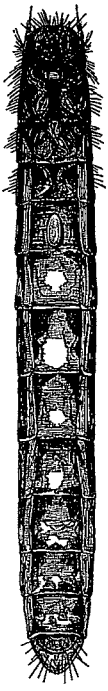


Fig. 2.
Larva of G. seriatum with egg of Epyris extraneus on ventral surface.

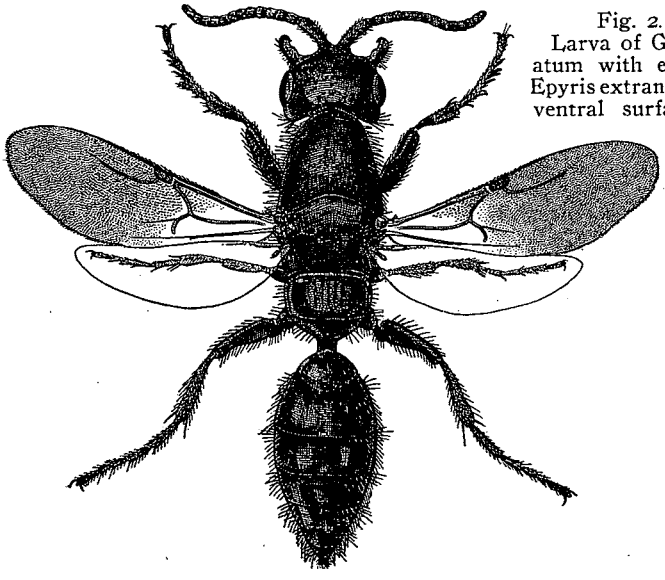


Fig. 3. Epyris extraneus.

leg movements and may also move and twitch the body a little; when seized with the forceps, however, this unusual stimulus causes it to wriggle vigorously.

On the morning of October 5, 1918, I was able to observe the field habits of this wasp on the Station grounds. The day was warm and sunny and in addition to *Epyris*, the introduced *Scolia manilae* Ashmead and *Dolichurus stantoni* (Ashmead) were also flying along the edges of an area planted to sugar cane. Male *Epyris* were the more abundant and evidently on the lookout for emerging females, but once in a while one of the latter could be seen flying low from place to place and hurriedly running beneath and among the superficial clods of earth in search of her prey. Finally I came upon one of these wasps circling about a spot and at last locating her paralyzed victim, a *Gonocephalum* larva which she had evidently wedged in between two small lumps of dirt. She seized it by the head end and, slinging it over her back, so to speak, dragged it into a hole nearby, wasp and grub entering at the same time. Later I could find nothing of wasp and prey on digging in the spot. I soon located another hunting *Epyris* and being provided with a *Gonocephalum* larva I carefully placed one of these alongside a small clod of earth under which *Epyris* was for the moment hunting; she issued therefrom very shortly almost exactly at the spot where lay her natural prey, still "playing possum". The wasp came immediately to attention, crawled carefully on the back of the larva and seizing it by the head with her mandibles curled her body around the thorax of the now vigorously squirming victim and soon immobilized it with her sting. No preliminaries followed as in many other wasps, the grub was seized without further ado apparently by a palpus and borne along rapidly on the wasp's back. The little insect was not quite half as long as her heavy booty which being carried with the back up nearly hid the wasp from view and made it appear as if the *Gonocephalum* was making headway under its own steam. After traveling thus rather aimlessly for eight or ten feet, the

Epyris, which was now quite tame, wedged her prey between loose pieces of soil, but not hiding it from view, left it to look for a nesting place; she examined several holes or ledges and finally selected a spot under a small piece of soil. During this hunt she returned once to her prey; now she seized it as before and carried it in a rather circuitous fashion towards the selected spot, but here, on account of the steep and crumbling nature of the ground, could make no headway, and so with my assistance she disappeared with her burden beneath a piece of soil. On digging in this place some minutes later I found the *Gonocephalum* an inch or more in the ground and the *Epyris,* a little further in the soil. The egg had not yet been laid.

On November 15 on a sugar plantation near Honolulu I unearthed a *Gonocephalum* larva which had a small *Epyris* grub feeding upon it.

The wasp seems to form a sort of cell about its paralyzed prey and completes her work with laying a pearly white egg upon her victim. The egg (Fig. 2) is about .70 mm. long and is glued for its length along the middle of the 4th segment; it is slightly curved along the line of appression, hardly three times as long as thick, and slightly broader and blunter at the head end, which, however, points towards the posterior extremity of the body of its host. The latter lies on its back in a more or less arched position. The egg hatches in about 2 1/2 days, the larva crawling out to segment 5, commences to feed on that segment; it is successful in penetrating or drawing nourishment through the tough integument of the beetle grub, so that it soon acquires a yellowish white color. In one case I found an *Epyris* egg fixed along the side of the body at about its middle length. The grub hatched and although its host was dead, managed to feed to maturity on it. It does not seem probable that the mother *Epyris* pierces the integument of her prey at the point where she lays the egg, so as to facilitate the feeding of the issuing grub; she selects the 4th ventral segment as a place for oviposition because it protects the egg

better there than elsewhere. Presently the position of the larva is reversed, for though always feeding at segment 5 it now lies head to head with its host. It was after this change of position (Fig. 4) that I found a shrivelled exuvial cap or moult skin glued just dorsad to the end of the body. A little later on there is a second moult. At the end of three days, it is about 4 mm. long, proportionately stout and more maggot-like than in most Fossoria; clearly segmented and of a dirty yellowish white color. It is closely fixed for its ventral length to the yet living *Gonocephalum* larva by a sticky substance. The third moult takes place in probably less than a day before the larva becomes full fed. It is now armed with a much larger and stouter pair of mandibles with which it bites a good-sized hole through the fifth ventral plate of host, inserts its head and fore part of the body through this aperture, and protruding therefrom at right angles (Fig. 6) eats out the interior, first taking one end and then the other. The beetle grub succumbs at the beginning of this crude operation and when entirely eaten out is reduced to a shrivelled, transparent brownish shell. As in other fossorial wasp larvae, it is most active in the last instar; it may squirm vigorously and with the aid of a clear yellow fluid rid itself of the three shrunken moult skins, each one telescoped inside the other to form a shallow concave wrinkled disk of yellowish color. The larva becomes full fed at the end of four or five days when it is about 7 mm. long by 2.5 mm. thick below the middle, fat and glistening, with little in the way of scallops or folds; it has a relatively small head armed with stout, dark-tipped mandibles and behind the latter, long protruding mouth-parts. Its posterior extremity heretofore rather bluntly rounded is now produced into a sort of nipple. It is mainly a pretty salmon pink color, peppered with white fat-bodies, which however are lacking along the ventral line, while the extremities and lateral folds are more glassy and clearer. It is well to draw attention to the four pairs of larval mandibles, representing the four instars (Fig. 5, a—d); they are drawn to the same scale, the

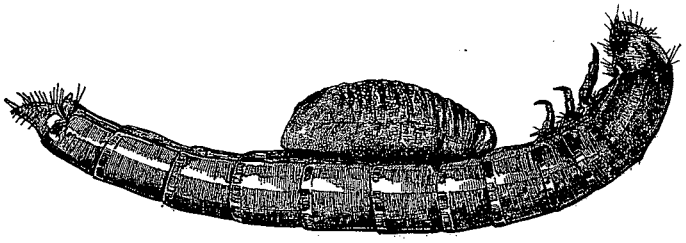


Fig. 4. Epyris extraneus larva feeding on larva of G. seriatum.

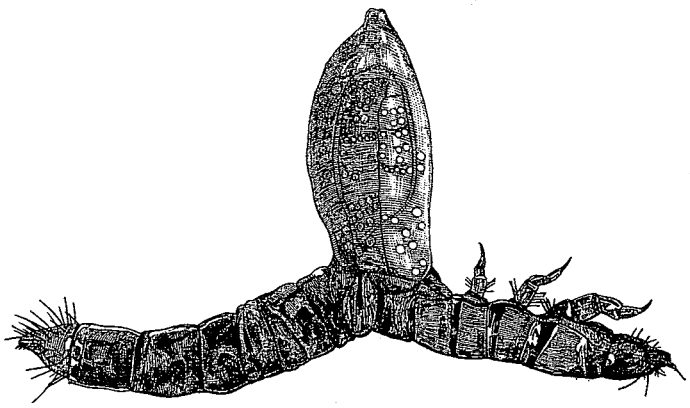


Fig. 6. Later stage of the same.

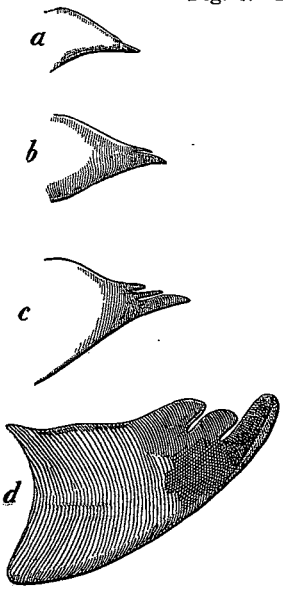


Fig. 5.
Mandibles of the successive stages of larvae of Epyris extraneus.

Fig. 8.
Pupa of E. extraneus.

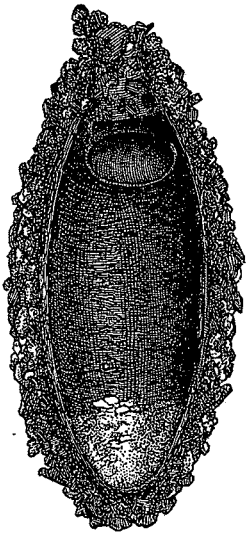


Fig. 7.
Cocoon of E. extraneus.

first three pairs are not of the chewing type represented by the last pair which is utilized by the larva for coarse work, i. e. biting through the *Gonocephalum* integument and consuming by mouthfuls, the interior of the body. This morphological change in mandibles is common if not usual among carnivorous larvae of Hymenoptera.

The full-fed *Epyris* larva is now very restless, it wriggles about and works itself free of its shrivelled host, leaving it with a gaping ventral hole, and after a brief period commences to form a cocoon. It reaches about for grains of soil which it attaches together with silk, thus forming a rough outer frame in which it spins a very tough and firm cocoon (Fig. 7) that tears cleanly like tinfoil, which it somewhat resembles in being smooth and silvery white within. It measures about 9 by 3 mm. and is a little broader and blunter anteriorly; near this extremity the cocoon is partitioned off squarely from the less firm terminal subconical portion, by a neat disc, which, being rather thin along the edges, is there cut away by the emerging wasp. The upper portion is then easily pierced by the insect. The resting larva within is rather active and bears the plainly visible compound eyes of the adult, as a darker patch on the sides of second thoracic segment. There is nothing remarkable about the whitish *Epyris* pupa (Fig. 8); it much resembles the adult in shape and size and bears no or very few spines or protuberances, so characteristic of many other wasps. The ovipositor is briefly exerted. The cocoon period for August-September was about 23 days, and with 2 1/2 days for the egg stage and 4 1/2 for the larval feeding stage makes the life cycle in the laboratory about a month. Perhaps the life cycle outdoors is more brief, as the *Goncephalum* larva frequently, if not as a rule, lives buried but a few inches in loose soil which during the day is kept very warm by the sun's rays.

The adult wasp is an active flyer and superficially appears much like a *Tiphia* wasp; it may be found at flowers and at

honey-dew on bushes. It probably spends much of its time underground.

The illustrations are the work of Mr. W. R. R. Potter, artist for the Hawaiian Sugar Planters' Association Experiment Station.

Some Observations on the Leaf-Hopper Wasp, Nesomimesa Hawaiiensis Perkins, at Pahala, Hawaii, Feb. 11-April 25, 1918.

BY F. X. WILLIAMS.

This is a slender, glossy black wasp (Fig. 1) about 1/2" (13 mm.) long frequently observed slowly flying in the more upland cane fields of the Hawaiian Agricultural Co. at Pahala. None was seen below an elevation of about 1,000 feet, and it was found to occur up to 3,500 feet; it was most plentiful, however, in Wood Valley, altitude 1,850-2,200 feet, where its adopted prey, the cane leafhopper (*Perkinsiella saccharicida* Kirkaldy) was for some months very abundant.

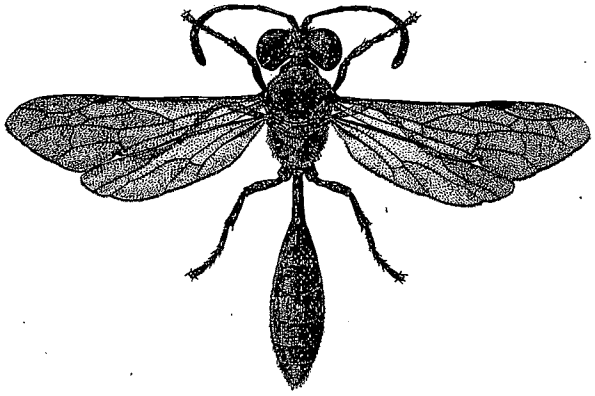


Fig. 1. Nesomimesa hawaiiensis.

Dr. Perkins has observed the Hawaiian Mimesidae storing their burrows with native daddy-longleg flies (Limnobiidae), but it is certain that some attack native leafhoppers as well.

Messrs. Swezey and Bridwell have observed *Nesomimesa antennata* (Smith) in the mountains of Oahu where it was catching *Oliarus,* a native leafhopper of the family Cixiidae, and Perkins in Fauna Hawaiiansis speaks of the unsuccessful efforts of *N. hawaiiensis* to catch Fulgoroid leafhoppers. In a shady gully at Pahala, I have seen both *Nesomimesa* and *Pipunculus* (a fly which parasitizes the cane leaf-hopper) searching the fronds of tree-ferns, and more than once the wasp pounced upon the moult-skins of *Siphanta acuta* Walker, a large green leafhopper, immature specimens of which as well as a smaller species of leafhopper occurred on these ferns. But where the cane leafhopper is to be obtained, both wasp and fly have transferred their attention to it in such a measure that they are often more abundant in the cane fields than in their native forest.

Nesomimesa usually hunts on the wing for her prey, but it cannot be said that she is a particularly good searcher, nor always adept at catching hoppers, and she is sometimes deceived by a cast-skin or a mouldy hopper. As a rule mature leafhoppers form her prey and what small proportion of young I have found in the cells were well grown. Not every grown hopper is suitable, for some reason many may be passed up by the wasp. Making her choice of victim she may poise a few inches before the *Perkinsiella* and make a dash at it, if successful, picking it off the cane with her jaws and legs. Or she may alight on a leaf and locating her victim nearby between leaf bases, with the aid of her wings, pounce upon it at close quarters. On several occasions I saw the wasp sting the hopper. Shortly after the latter is captured, the wasp turns it underside uppermost, and holding it thus in her middle pair of legs, doubles up her abdomen and stings it in the neighborhood of the throat. The sting is administered more than once and the act may be performed either when the wasp is resting on a leaf with her prey or hovering in the air with it.

The wasp easily flies homeward with her quieted victim,

holding it venter upwards beneath her, clasping it about the back of the neck or thorax with the end portion or tarsi of her middle pair of legs so that the spines at the tip of the tibiae are brought across the hopper's throat. Being held only by the wasp's middle pair of legs the hopper hangs obliquely under its carrier.

I noticed several *Nesomimesa* burrows in the vertical bank of a creek bed at the lower Wood Valley Station, altitude 1,850 feet. Above the rich soil was a layer of "pahoehoe" or layer lava which doubtless prevented excessive moisture from seeping through to the burrows. The latter from one to several feet above the ground in the bank, were sometimes located by the grains of soil heaped up below a burrow. Several wasps were seen examining the bank and occasionally alighting on the soil for a few minutes; but when a wasp was engaged in storing her burrow she usually strove to locate and enter it as quickly as possible. The nest-holes are cylindrical and enter the bank at a slight angle from the horizontal. The main shaft is 6-8 inches long and sometimes ends quite steeply, giving off here rather long branches, each terminating in a spacious oval cell about 15 mm. long and 8.5 in greatest

Fig. 2. Burrow and nest of Nesomimesa hawaiiensis.

diameter. These cells which may number 18 to one nest are horizontal or nearly so, and the passage to them plugged with soil up to the main burrow (Fig. 2). This seems sometimes to be done even when the cell in question is not yet completely

provisioned. Where several nests are in close proximity their respective cells cannot always be associated. One nest which I laid bare had three cells, an older one showed twelve, while a completed one had eighteen, each containing a wasp cocoon. The twelve-cell nest had 3-16 hoppers to a cell, but in some instances the cells were not yet completely provisioned, while others contained large larvae or cocoons with a few perfect hoppers and a quantity of small fragments of the provisions.

None of these or other interned hoppers showed any movement, in fact some were not in good condition, among them being mouldy specimens. But one egg is laid to a cell. The egg is glued on the underside of one of the hoppers, being secured longitudinally thereto so that its anterior or head end is near or touches the base of one of the fore legs of its host. The egg is very slightly curved, several times longer than its thickness which is nearly uniform throughout, being very little more bluntly rounded at its anterior than at the posterior extremity. It is 2.5 mm. in length and pearly white.

The larva hatches probably in about two days and devouring its store of provisions at the end of about six days more, commences to spin its cocoon. It is then about 12 mm long and spindle shaped, the head is of medium size and provided with sharp and slender jaws. The body is well segmented though the lateral folds are not plainly marked, while the whole skin is provided with very fine transparent granulations. The mid-gut is lead color, while both etxremities of the body are glassy white. The silken cocoon is rather delicate, surrounded by bits of soil and leafhopper remains, it tapers a little more at the posterior end, measures from 10 to 15.5 mm. long by 3.5 to 5 mm. at its greatest breadth, and is of a light-brown or tan color. A large female pupa (Fig. 3) is about 13 mm. long and is rather stout for so slender an insect, the waist being comparatively thick. The top of the head bears two pairs of spines and the mesonotum a pair of low tubercles. There are no lateral tubercles but the processes on the antennae and legs are knobbed. Its first color is probably pearly white.

Several cocoons which I unearthed April 6 and brought to the Experiment Station yielded adults in the first week of May.

The wasp does its share in destroying leafhoppers; while immensely less numerous than the cane pest, it is nevertheless abundant in some fields, where one female may capture 100 or more hoppers for provisioning her nest. In a twelve-celled nest 65 cane leafhoppers were counted, and as this burrow contained three cocoons and one or two other cells in which the provender had been largely consumed, it is quite safe to estimate the number of *Perkinsiella* supplied here as exceeding 100.

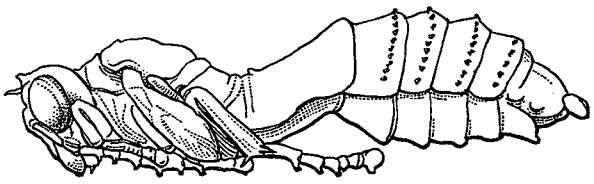


Fig. 3. Pupa of Nesomimesa hawaiiensis.

But while *Nesomimesa* has beneficial habits, it does not work in full harmony with the *Pipunculus* fly heretofore mentioned. Be it noted that of the 65 hoppers stored by one wasp, 15 of these were already parasitized by *Pipunculus*. This is a far higher per cent. of *Pipunculus* parasitism (23%) than existed in the adjacent cane field, from which *Nesomimesa* very probably caught her prey, (4.09%). Some of the fly maggots in the cells were alive in the hoppers, and others still, brought in through the medium of their host, were sufficiently far advanced in development as to be able to pupate. Four pipunculated hoppers secured from a wasp's nest failed to produce puparia, and though *Pipunculus* sometimes do hatch in the cells, it is doubtful if they can work their way entirely out of their earthen prison. Possibly the more sluggish behavior of *Pipunculus*-parasitized hoppers in the field permits of their being captured with greater ease and therefore frequency by the wasp than their more healthy brethren.

Although this wasp works best during the sunshine it will

industrially bring in hoppers in cloudy weather and even as I once observed, during a light rain.

During November I had occasion to visit the Wood Valley region again. The cane leafhopper had disappeared and *Nesomimesa* was pursuing her vocation higher up among the shrubbery of the native forest which flourished at an elevation of several hundreds of feet above the cane fields.

Thus it seems that this wasp which is really a forest insect, may from time to time be compelled to fall back on native leafhoppers as a sparser though more dependable source of food supply for her young than is furnished by *Perkinsiella*, the cane pest.

The figures are the work of Mr. W. R. R. Potter, illusrator for the H. S. P. A. Experiment Station.

Some Observations on Pipunculus Flies* Which Parasitize the Cane Leafhopper, at Pahala, Hawaii, Feb. 11-April 25, 1918.

BY F. X. WILLIAMS.

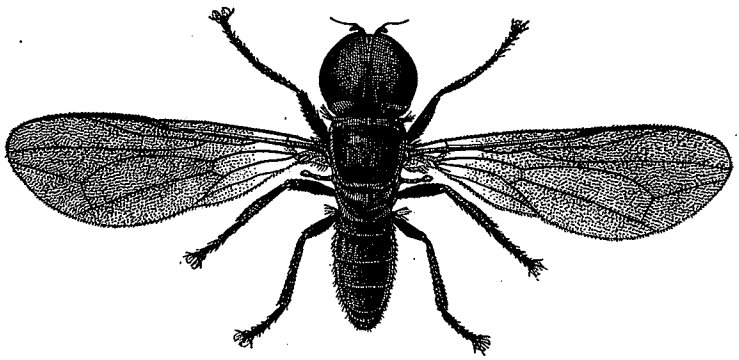


Fig. 1. Pipunculus sp.

This is a rather small blackish fly (Fig. 1) which like the wasp *Nesomimesa hawaiiensis,* has largely transferred its atten-

* Three species of *Pipunculus* were taken at Pahala; *P. juvator* Perkins, *P. hawaiiensis* Perkins and an undescribed species.

tions from native leafhoppers to our introduced pest, the cane leafhopper.

Pipunculus, spending a large part of its existence in flight, is provided with particularly long wings. Its eyes are so far developed as to be contiguous or "holoptic", occupying almost the entire head, while the feet are provided with pads and long claws for snatching up its prey.

Pipunculus is a more widely distributed insect than *Nesomimesa;* it was found on a number of plantations, extending from near sea level to well into the moist forests. Like the wasp, it was most abundant in the Wood Valley region, in places where the leafhopper occurred in some numbers. It is easily recognized by its hovering flight varied now and then by a jerky shift. The male is slightly the larger of the two, his wings are a trifle darker and his flight a little different from that of the female, for where the latter closely scrutinizes cane stems, leaves, weeds, or ground, searching for her prey, the male flies somewhat more hurriedly and does not peer so into retreats, etc., and thus covers more ground. Both sexes are often seen on cane leaves, feeding on dew or honeydew. The male carries his mate about and both are often thus taken on the wing.

On numerous occasions I have seen *Pipunculus* capture her prey and sometimes several of these huntresses could so be seen at one time. One is not always impressed with the fly's selection of hunting grounds, and like *Nesomimesa,* she is sometimes deceived, though only for the moment, into snatching at leafhopper moult-skins. The victims selected are very small to perhaps a little less than half-grown leafhoppers. A suitable one being discovered by the hovering fly is suddenly pounced upon and snatched up in the air. The captive is sometimes dropped almost immediately as if unsuitable, others, however, are held in mid-air for from one to several seconds; the fly usually rising a little with her burden which would be dropped on a leaf or on the ground. Often immediately thereafter, *Pipunculus* would hunt out another hopper, showing that

she must have several eggs ready for laying. While in the air with her victim, her abdomen could be seen curved towards it; she is provided with a sharp corneous ovipositor, with which she either pierces the hopper's body or inserts her very small egg (not seen) under a body fold. At any rate the liberated homopteron seems unhurt and usually hops away. If the young hopper is too large, the fly is sometimes apprised of the fact by being hurled back by the insect's vigorous leap.

In catching recently pipunculated hoppers, I found it best to sit down before a sort of clearing among cane plants, shake down a number of hoppers and place leaves bearing many young, in suitable positions and with a white cloth or handkerchief held beneath her, carefully but quickly follow a burdened *Pipunculus*. As soon as the hopper is liberated, it falls on the cloth and a wide-mouthed vial is clapped over it. I was unsuccessful in many attempts but managed thus to secure 6-7 parasitized hoppers in about an hour.

The life of the young *Pipunculus* is rather long, inasmuch as it is not ready to leave its host's body until some time after the latter has become mature. Then a male hopper thus parasitized develops a much swollen abdomen, but I was not able for certainty to distinguish similarly affected females. The latter often have the body normally swollen with eggs, but when pipunculated, these eggs are consumed by the growing parasite. In its early stages, the maggot is rather soft and delicate, in later development it is decidedly tough; then it is tinged with orange, is wrinkled and active and short-oblong in shape.

On April 12th, I captured a few small hoppers which had been caught up and dropped by *Pipunculus*. Some of these were successfully transported to the Experiment Station in Honolulu, where five of them matured in the first part of May. By May 14th one male was seen to have a swollen abdomen and thus to be certainly parasitized, but unfortunately it died shortly thereafter. The last of these hoppers to die, a short-winged female, did so on May 20th, and her abdomen

contained an almost mature *Pipunculus* grub. Thus we may estimate the egg and larval stage of the fly, at the commencement of the warm season as approximately forty days.

The mature grub makes its way out of the hopper's body, thus killing the already sluggish insect, and after some hours forms a very stout, dark-brown puparium. In the cane fields these puparia were not infrequently found at the base of cane leaves or elsewhere on the leaf. The pupal stage at Pahala, 800 feet, for February-March was found to be 28 days in one case and 34 in another.

At first it appeared that the male hoppers were the more often parasitized by the fly; I believe, however, that this was because the parasitism was more easily recognized in that sex. Affected hoppers were very frequently captured by the *Nesomimesa* wasp and this seemed to apply particularly to males, as can be seen from the following table for April 4th. One wasp nest contained hoppers as follows:

Males	28	Females	34
Parasitized	14	Parasitized	1

All hoppers here were carefully examined.

The following are percentages of leafhopper parasitization by *Pipunculus*. They are probably underestimated owing to the difficulty of distinguishing small *Pipunculus* maggots.

			Feet Elevation	Leafhoppers Collected	Parasitized	%
Pahala	3/11	Upper Moaula (Field No. 1)	2300	35	4	11.4
"	4/1	Wood Valley Homesteads	2150	196	7	3.57
"	4/3	Wood Valley Homesteads	2150	104	6	5.77
"	4/4	Wood Valley Variety Sta.	1850	63	15	†23.
"	4/6.	Wood Valley Variety Sta.	1850	99	4	*4.04
"	4/10	Middle Mud Flow (Field No. 40)	1900	178	4	2.24
	4/22	Mill Field (Field No. 14)	750	82	11	13.4
Olaa	3/15	Mountain View (Field 6)	1500	333	12	3.6
"	3/15	Mountain View (Field 6)	1500	215	10	4.63

† Hoppers taken out of nest of *Nesomimesa* wasp.
* Many hoppers died.

Dictyophorodelphax praedicta sp. nov. (Homoptera, Delphacidae)

BY JOHN COLBURN BRIDWELL.

Length 5.6-6.4 mm.; length of prolongation of head in front of eyes 2.5-2.8; length of tegmen 1.3-1.6.

Very much like *D. mirabilis* Swezey but darker. The prolongation of the head is shorter, only about the length of the body and the apical depressed portion is much shorter and compressed, the space between the dorsal carinae being acuminate at apex. Lateral carinae confluent at about two-thirds of their length from the base.

The tegmina are shorter than in the other species, the four apical segments of the abdomen being visible beyond them instead of ~~through~~ three, as in the case of the other two species. The black dots along the veins are much reduced in comparison with the other species.

The nymphs closely resemble those of *D. swezeyi* Bridwell but the prolongation of the head is slightly deflexed instead of straight.

♂ The genital styles are more elongate than those of *D. swezeyi* and only gently curved, the slender points not being clawlike as are those of *D. mirabilis*. The extreme apices are slightly blunt and recurved.

Fig. 1. Dictyophorodelphax praedicta, edeagus (highly enlarged).

The edeagus has the slender apical portion nearly in a straight line with the not greatly stouter basal portion. The ventral surface of the slender apical portion is covered with many small reflexed teeth and there are two groups of stouter

pg. 71. The figure is the work of Mr. W. R. R. Potter, illustrator for the H. S. P. A. Experiment Station.

teeth on the dorsal surface, one basal and the other at the origin of the apical processes. At about two-thirds the distance from the base, the apical slender portion is divided into two apical processes, of which the ventral is stouter and only about two-thirds the length of the dorsal and is dorsally curved. The dorsal process is ventrally curved and somewhat strap-shaped.

In *D. swezeyi* the dorsal teeth are in a single group at the base of the slender portion while the ventral teeth are larger and the teeth are much the same in *D. mirabilis.*

Described from 13 ♀ ♀, 9 ♂ ♂ and one nymph, August 8, 1918 (O. H. Swezey) 21 ♀ ♀, 10 ♂ ♂ and 5 nymphs, Aug. 13 and Sept. 8, 1918 (J. C. Bridwell), collected on *Euphorbia hookeri integrifolia* in Iao Valley, Maui, Hawaiian Islands, at elevations of 600-800 feet on the lower slopes of the ridges rising out of the valley.

Type ♂ and allotype ♀, nymphs and paratypes deposited in the collection of the Hawaiian Entomological Society. Paratypes in the collections of the Hawaiian Sugar Planters' Association, the Bernice Pauahi Bishop Museum, and in the private collections of J. C. Bridwell, O. H. Swezey, and P. H. Timberlake.

My thanks are due to Mr. Frederick Muir for the preparation of the drawing of the edeagus accompanying and to Mr. P. H. Timberlake for the dissections upon which the descriptions of this species and *D. swezeyi* were based.

NOTES AND EXHIBITIONS.

Maui Delphacids.—Mr. Giffard exhibited 6 species of Delphacidae collected on Maui in August by Mr. J. F. Rock, viz.:

From Mt. Eeke, 5,000 feet elevation, West Maui:
1 specimen *Nesorestias* n. sp., or *Ilburnia* n. sp.
If the latter, probably a variety of *I. fullawayi.*

Small series of *Ilburnia fullawayi* var. All off *Argyroxiphium* sp.

From Waikamoi, East Maui, approximately 4,000 feet elevation:

Large series of *Ilburnia* sp. off *Gunnera petaloidea.*

Large series of *Ilburnia* sp. off *Pipturus.*

Small series of *Ilburnia* sp. off *Cyanea aculeatiflora.*

Small series of *Ilburnia* sp. close to *I. blackburni,* off *Cyanea hammatiflora.*

Both sexes and nymphs were represented.

Hawaii Delphacids.—Mr. Giffard exhibited a collection of Delphacidae collected by himself on the Island of Hawaii during the months of July and August. With the exception of a few hours collecting in a remote district, the whole collection was taken within a radius of 5 or 6 miles from his residence in Olaa near the Volcano Kilauea. The exhibit included the following:

Series of all the 3 known species of *Nesodryas* from that Island, with the addition of a small series of one new species from *Antidesma platyphyllum.*

A large series of *Nesodryas munroi* from *Dodonea viscosa* var. *spathulata,* which hitherto has only been taken sparsely on the Island of Lanai on the same food-plant.

Of the species of the *Leialoha* and *Aloha* groups, all were collected with a view to sorting out variations in color. A small series of one new species of *Aloha*(?) taken on the sand desert at the Volcano off the common fern, *Nephrolepis exaltata,* will make the fourth of the genus so far taken on the Island of Hawaii.

The genus *Ilburnia* was also well represented by all the species with the exception of one species from Kona (which place was not visited) and two other old species which have not as yet been verified by the capture of males. The common species of this large genus were taken on this occasion

because of variations in color or because of these being attached in numbers to food-plants so far not recorded.

Of the genus *Ilburnia,* the collection also included 3 new species in series of both sexes, viz.:

One species off *Coprosma ernodeoides,* taken in Olaa.

One species off *Smilax sandwicensis,* taken in Olaa.

One species off *Lipochaeta subcordata,* taken in the a-a flows at Kahuku, Kau.

Samoan insects.—Mr. Giffard exhibited a second consignment of insects received from Dr. H. C. Kellers, U. S. N., collected at various elevations on the Island of Tutuila of the Samoan group. Of particular interest was the large series of a number of species of Fulgoridae and Jassidae.

Ilburnia koae.—Mr. Swezey exhibited a series of this Delphacid collected on koa at Kaiwiki, Hawaii, some of which had shorter tegmina than usual and lacked wings. This form was thought not to have been previously recorded.

Insects from Kaiwiki, Hawaii.—Mr. Swezey exhibited a miscellaneous collection of insects made on a one-day trip to Kaiwiki, Hawaii, in the forest about 9 miles above Hilo. There were 260 specimens, representing about 75 species.

Trypoxylon sp.—Mr. Swezey reported the capture in Hilo of the small undetermined *Trypoxylon* common in Honolulu. This species had not been previously reported from Hawaii. However, when brought to the attention of Brother Matthias Newell, he said he had known of its presence in Hilo for several years but had not recognized it as being distinct from the larger species *T. bicolor.*

Nesodryas eugeniae.—Mr. Timberlake exhibited specimens of this Delphacid taken on *Straussia kaduana,* which constitutes a new host for the species. It was taken on it at different times during the past month.

Ilburnia koebelae

Nesodryas n. sp.—Mr. Timberlake exhibited specimens of a new species of *Nesodryas* taken on *Kadua.*

Oechalia.—Mr. Bridwell presented notes on this genus of

bugs of which he considered there were five distinct species or sub-species from the different Islands.

Calandra remota.—Mr. Bridwell reported that this Curculionid which he has found in banana stumps at several different places in the mountains and foot hills back of Honolulu, he has recently distinguished in the Experiment Station, H. S. P. A. collections, collected by Mr. Muir in China, Malay Peninsula, Java, Borneo and Amboina. This demonstrated it to be an immigrant in Hawaii.

Alphitobius diaperinus.—Mr. Bridwell reported finding this Tenebrionid beetle in a bag of spoiled mixed feed at Haiku, Maui.

Rhyncogonus lahainae.—Mr. Bridwell exhibited a Curculionid beetle captured by him on Maui, which agrees fairly well with the description of this species.

Maui Delphacids.—Mr. Bridwell exhibited 11 species of Delphacidae recently collected on Maui. They will be worked up by Mr. Muir in a forthcoming paper along with other Maui material.

Jassids from Maui.—Mr. Bridwell exhibited 6 species of Jassidae collected on Maui: 3 species in Iao Valley on *Euphorbia, Pipturus,* and *Dodonea viscosa* respectively; 3 species on Haleakala at 6,000 feet, one on *Dodonea* and two on *Eragrostis atropioides* respectively.

Capsid resembling Reduviolus.—Mr. Bridwell exhibited a peculiar Capsid bug resembling *Reduviolus* captured by him on a grass (*Deyeuxia*) at the summit of Haleakala, Maui.

Proterhinus sp.—Mr. Bridwell reported capturing a peculiar species of *Proterhinus* in dead wood of *Cyrtandra* in the mountains back of Tantalus. The species has long spinous setae and is evidently an undescribed form, but the specimen unfortunately is defective, having lost its head. The species differs from *P. blackburni* Sharp in having the subsutural ridges produced forward in front of the anterior margin of the elytra much as in *P. deinops* Perkins, which is otherwise very different.

NOVEMBER 7TH, 1918.

The one hundred fifty-eighth meeting of the Society was held in the usual place. Members present: Messrs. Bridwell, Ehrhorn, Giffard, Mant, Muir, Rosa, Swezey and Timberlake. As none of the officers were present at the opening hour, Mr. Giffard was chosen as chairman of the meeting, and he appointed Mr. Swezey as secretary.

Minutes of previous meeting were read and approved with corrections.

PAPER.

Studies in Rhynchophora (Coleoptera). V. The Genus Rhyncogonus.

BY DR. DAVID SHARP.

(PRESENTED BY MR. F. MUIR)

Rhyncogonus Sharp, 1885.
Tr. Dublin Soc., Ser. 2, Vol. III, p. 176.

When I established this genus, I indicated its relations to *Celeuthetes* and *Elytrurus*. These two genera are placed by Lacordaire in the division Celeuthetides, and it would therefore appear that I was of opinion that *Rhyncogonus* is a Celeuthetid, though I specially pointed out its similarity to *Otiorhynchus*, which Lacordaire considers to be a member of a group of genera (*Otiorhynchides vrais*) distinct from Celeuthetides. In order to settle the position of this interesting and important division of the Hawaiian fauna, I have reinvestigated the question, with the result of finding that *Rhyncogonus* has characters so peculiar that it should form a separate group of Otiorhynchidae that may be called *Rhyncogonides* triba nov. The chief character of the group consists in the form of the buccal cavity; this is not filled externally by the mentum, so that the maxillae are visible for all their length, while the maxillary cleft extends backwards beyond the junction of the

mentum with the head-surface so that a short gular peduncle exists. This is a great peculiarity in the Otiorhynchidae, where it is the rule that the maxillae are quite or nearly covered by the mentum, this point of structure being in fact that on which Lacordaire founded his Legion Adelognathi, so that the condition we find in *Rhyncogonus* would suggest its removal from the Otiorhynchidae, and that it should find a place in the Phanerognathi, among the host of forms of which legion there is so far as I know nothing at all allied to *Rhyncogonus*.

The Phanerognathous condition of the mouth is most completely displayed by *Rhyncogonus koebelei,* but it exists in all the other species of *Rhyncogonus* I have been able to see, though to a less conspicuous extent.

Some of the Celeuthetides have the mouth not completely Adelognathus (e. g. *Elytrurus*), and it is probably to these that *Rhyncogonus* is nearest, but the Celeuthetides have also the corbels more or less modified whereas they are quite simple in the Hawaiian genus. The Celeuthetides are specially characteristic of the Polynesian area, and we shall not be far wrong I believe if we consider that *Rhyncogonus* is a Celeuthetid form, with more simple (or primitive) conditions of the mouth and tibiae.

NOTES ON SOME SPECIES AND THE MALE CHARACTERS.

The material for an exhaustive study of *Rhyncogonus* is at present far too small for any attempt at a revision—much less a monograph—of the genus, but I hope the following notes based on some specimens from the collections of Dr. Perkins and Mr. Giffard may prove useful.

Rhyncogonus blackburni Sharp.

This species as it stands at present is very variable, and it is possible that there may be more than one standing under the name. I have examined to a slight extent the male genitalia of a few specimens, and I find differences among them, but so slight that importance cannot be attached to them unless

the slight distinctions should be found of importance when a good examination of a number of examples is made. Figure 1 shows the male structure fairly well of an example from Tantalus, Oahu (1500 ft.) with the sac extended. In other specimens the shape of the membranous part of the sac is a little different, and the shape of the apical portion of the median lobe itself is not quite the same.

Rhyncogonus sp. (?)

In the Giffard collection there is one specimen that appears to be a new species. It is a male, found in dead leaves at Helemano, Oahu. It is scarcely 6 mm. and has somewhat the appearance of a minute *blackburni* with flat shining elytra, white hair extending all the length of the side of the thorax. The male organ has been examined; the apical portion of the median lobe is unusually short and broad. This specimen has been labelled by me as R. 18.

Rhyncogonus koebelei Perkins.

This was described from a single male example, but was subsequently reported by Dr Perkins as being plentiful in the Manoa Valley on Oahu. The species is the most remarkable of the genus, the maxillae being completely exposed, and the eyes not prominent. There is a small series from Palolo Valley, Oahu, in the Giffard collection, including both sexes. In the male the median lobe has the apical portion much prolonged and the tip curved upwards. The sac appears to be almost cylindrical, and the large transfer apparatus to be so placed as to continue the axis of the sac, but only one specimen has been seen and confirmation is desirable.

Rhyncogonus sp. n. (?)

In the Giffard collection there are two males of a form very closely allied to *koebelei,* but with obsolete sculpture on the thorax, the elytra a little differently shaped, being rather shorter, more convex and with indistinct lateral margin. The buccal cavity and the eyes are quite as remarkable as they are

in *koebelei.* The apical portion of the median lobe of the aedeagus (Fig. 3) is not so prolonged, and this would seem to point to a really distinct species. Waimano Mountains. Labelled R. 6.

Rhyncogonus sordidus Perkins.

I refer a small series of specimens in the Giffard collection from the Island of Lanai to this species, and with much doubt two from Oahu. In the specimens examined from Lanai the apical portion of the median lobe is broad, comparatively short, and with very slightly curved upwards tip. I think the Oahu form has a still shorter apex of the median lobe, and a better series might show it to be distinct.

Rhyncogonus sp. n. (?) near R. stygius.

Three specimens (1 male, 2 females) from *Freycinetia,* Wahiawa, Oahu, are probably yet another new species. It is a large form, perhaps a little smaller than *blackburni,* with rostrum rather longer, and the snout less dilated, the eyes less prominent. The aedeagus of a specimen labelled R. 4 suggests a close relationship with *blackburni.*

My examination of the male organs, inadequate as it is, shows that the male copulatory apparatus is of a simple nature, very common in Otiorhynchidae, and that different species in this genus exhibit only slight distinctions. In fact this seems to support the theory that all the species may have arisen in the Islands from a single species. A careful examination of numerous specimens with a view to ascertaining the constancy or variation of this organ is eminently desirable.

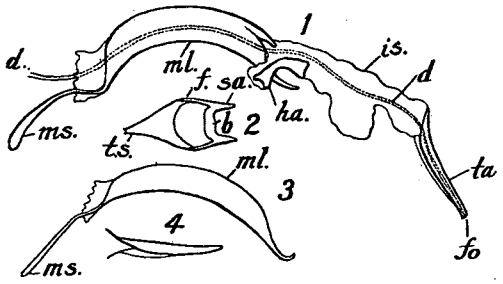
In his review of the genus in the Introduction to the Fauna Hawaiiensis, Dr. Perkins enumerated 24 species of *Rhyncogonus,* and mentions that none is known to occur on Hawaii. Mr. Giffard has, however, found a species there, of which description follows:

Rhyncogonus giffardi sp. n.

Fusco-niger, parce griseo-squameus, antennarum funiculo tibiusque subflavescentibus, elytris convexis ad latera minus discrete carinatis; oculis mediocriter convexis. Long. inc. rostr. 8 mm.

Hab. Insula Hawaii.

The only specimen is in bad condition, but is certainly a distinct species, and as the genus has been hitherto unrepresented in the Island of Hawaii, it is well to name this species, and it is due to its discoverer, W. M. Giffard, that his name should be associated with it.



EXPLANATION OF FIGURES.

Fig. 1. Median lobe, *Rhyncogonus blackburni,* internal sac extended.

Fig. 2. Tegmen, *R. blackburni,* dissected off the median lobe, which it encircles.

Fig. 3. Median lobe of *R. koebelei,* sac not extended.

Fig. 4. Transfer-apparatus of *Rhyncogonus* sp. near *koebelei.*

Lettering is uniformly as follows:—b. bridge of tegmen; d. duct; f. fork of tegmen; f. o. functional orifice; h. a. hinge-apparatus; i. s. internal sac (usually quite hidden); s. a. superior appendage of tegmen; t. a. transfer apparatus; t. s. tegminal strut.

In facies intermediate between *R. vestitus* and *R. simplex,* and may be placed near the latter, from which it is distinguished by the denser pubescense and by the elytra markedly acuminate at the apices. Eyes about as convex as in *simplex.* Thorax densely punctate with a smooth space along the middle near the front, the pallid pubescense forming a rather large patch at the sides behind, elsewhere scanty. Elytra with more

pubescense, forming irregular patches, which however allow the sculpture to be seen. It consists of series of moderately large punctures. Underside rather strongly punctured at the base of the abdomen. The mentum allows the maxillae to be seen at its sides but only slightly.

The specimen is a male, with the abdomen rather deeply impressed at the base, and much hair on the terminal segment. It was taken on *Acacia koa* at Puuwaawaa, North Kona, Hawaii, at an elevation of 3700 feet, August 8th, 1917.

The type is in the collection of Mr. W. M. Giffard.

NOTES AND EXHIBITIONS.

Cryptorhynchine beetle in ginger.—Mr. Swezey exhibited an adult weevil found in rhizomes of the common white ginger (*Hedychium coronarium*) at the grounds of George Sherman, Nuuanu, November 4th, 1918. It was apparently a beetle that had not been noticed before. A small patch of the plant was being killed out. Several larvae and pupae and two beetles were found among the much-eaten rhizomes.

After some discussion, a motion carried that in co-operation with the Board of Agriculture an attempt be made at tracing the distribution of the pest and employing means of eradicating it. As a Committee for this purpose Messrs Ehrhorn and Swezey were appointed.

Cerambycid beetle.—Mr. Bridwell exhibited a specimen of the same Cerambycid beetle which was reported by him at the July, 1917, meeting as having reared from dead papaia leaf stems, and at the June, 1918, meeting from pods of *Acacia farnesiana.* The species has not been determined yet, but it was collected by Mr. Williams in the Philippines, where it was the prey of certain wasps whose habits he was observing. Hence, it is to be considered an immigrant from the Philippines.

Considerable discussion followed in regard to methods by

which immigrant insects may arrive in spite of present efficient quarantine methods.

Mr. Giffard related the manner in which certain termites reached Honolulu in army bed cots from the Philippines after the Spanish-American War, became established at the waterfront and have spread to other parts.

Mr. Ehrhorn related the intercepting of termites in a shipment of banana plants and yams from the Philippines. They were in great quantities in the shipping boxes, and were promptly incinerated in the plant quarantine laboratory.

Mr. Muir reported that it is believed the rhinoceros beetle was introduced into Samoa in the sleeping mats of immigrants from India, as it had been found under such circumstances.

Jassid on Amaranth.—Mr. Ehrhorn exhibited specimens of a small green Jassid collected by him recently on the weed, *Amarantus spinosus,* near his office at the waterfront. It was apparently a different species from the other similar Jassids occurring on grasses here, and probably is a new immigrant.

DECEMBER 12TH, 1918.

The one hundred fifty-ninth meeting of the Society was held in the usual place, Vice-President Timberlake in the chair. Other members present: Messrs. Bridwell, Crawford, Ehrhorn, Fullaway, Giffard, Grinnell, Muir, Potter, Rosa, Swezey and Williams.

Minutes of previous meeting read, corrected and approved.

In behalf of the Committee to investigate the ginger weevil, Mr. Swezey reported that all the infested plants at Mr. Sherman's residence had been dug up and burned. Later, the weevil was found in a patch of ginger on the Tantalus Trail, near the Schaefer residence, but other patches of ginger at higher elevations on Tantalus and in Nuuanu Valley were found uninfested. He had reared adult specimens from larvae previously brought in. Mr. Ehrhorn reported that an examination of the records of quarantine inspection disclosed no record

of infested ginger; that the market contained no infested ginger so far as he had found; and that other kinds of ginger than *Hedychium coronarium* including the red ginger of Fiji, another species with cone-shaped flowers and still another low form, probably a native species, were examined and no trace of infestation found. After some discussion, it was voted that the report be accepted in course and in view of the prevailing opinion that the pest might be eradicated if prompt and vigorous action were taken, the Secretary was instructed to address the Superintendent of Forestry asking the coöperation of the Board of Agriculture and Forestry to this end, stating at the same time that whatever assistance could be rendered by individual members of the Entomological Society would be gladly given.

Messrs. Swezey and Fullaway were appointed a committee to prepare a memorial for Mr. H. O. Marsh, a former member whose death had recently been noted.

PAPERS.

New Hawaiian Delphacidae (Homoptera).

BY F. MUIR.

The list of Hawaiian Delphacidae has been considerably increased during 1918. This is chiefly due to the activities of Messrs. Bridwell, Fullaway, Giffard, Rock and Swezey. In the present paper eighteen new species, one new sub-species and two new varieties are described, but a considerable portion of the collected material has not yet been worked, chiefly consisting of a collection made by Mr. W. M. Giffard in Hawaii. This latter material contains several new species. An extension of localities has been noted for several species, and the food plants of most of the new species and of some of the old ones are recorded. The taking of *Nesodryas laka* (Kirk.) and *Ilburnia monticola* (Kirk.) is of interest as no specimens of